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इस भाग में भिन्न पृष्ठ संख्या दी जाती है जिससे कि यह अलग संकलन के रूप में रखा जा सके

(Separate paging is given to this Part in order that it may be filed as a separate compilation)

नोटिस

(NOTICE)

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मांग-पत्र प्रबन्धक के पास इन राजपत्रों के जारी होने की तिथि से दस दिन के भीतर पहुँच जाने चाहिए।

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(रक्षा मंत्रालय को छोड़कर) भारत सरकार के मंत्रालयों और उच्चतम न्यायालय द्वारा जारी की गई विधितर नियमों, विनियमों तथा आदेशों और संकल्पों से सम्बन्धित अधिसूचनाएं

[Notifications relating to Non-Statutory Rules, Regulations, Orders and Resolutions issued by the Ministries of the Government of India (other than the Ministry of Defence and by the Supreme Court)]

राष्ट्रपति सचिवालय

नई दिल्ली, दिनांक 15 अक्टूबर 1970

सं० 50-प्रेज/70.—निम्नलिखित व्यक्तियों को अपने जीवन का महान संकट की परिस्थितियों में डालकर साहस एवं तत्परता प्रदर्शन करने के लिए राष्ट्रपति उत्तम जीवन रत्ना पदक प्रदान करने का अनुमोदन करते हैं :—

1. श्री गोपेश्वर शेखर,
ग्राम व डाकघर अमलाबाद,
पुलिस स्टेशन चन्दनबगरी,
जिला धनबाद, बिहार ।

1 अगस्त, 1969 को, बिजला की खराबी के कारण समझ भौरा कनकानी कॉलरीज लिमिटेड की अमलाबाद कोयला खान के अन्दर आग लग गई । यह आग धरती से 800 फीट नीचे में शुरू हुई तथा उग समय भूमि के नीचे लगभग 250 व्यक्ति थे । आग के स्थान के बहुत निकट में ज्वलनशील गैस बाहर आ रही थी । गैस के आग पकड़ने की हानि सम्भावना थी जिससे खान फट सकती थी । इसी बीच 'माइनिंग मरदान' श्री गोपेश्वर शेखर तुरन्त ही बिना धरमारे अपने जीवन को खारे में डालते हुए, उस ज्वलनशील गैस के स्रोत तक पहुँचे और सधान, मंचरा को बन्द कर गैस को आग पकड़ने से बचा लिया । उन्होंने सभी मजदूरों को भी सावधान कर दिया कि खान से बाहर निकल जायें । यह सुनिश्चित करने के बाद कि इस विषाक्त गैस तथा धुएँ से किसी भी व्यक्ति को नुकसान नहीं होने वाला है, उन्होंने कुछ अन्य श्रमिकों तथा वरिष्ठ परिनिरीक्षकों की सहायता में आग बुझा दी ।

श्री गोपेश्वर शेखर ने इस आकस्मिक अग्नि का पता लगाने, उस पर काबू पाने तथा इससे होने वाले विनाश को रोकने में उदाहरणीय साहस और सूत्र-बुद्धि का परिचय दिया ।

2. श्री रामप्यारे हरिजन,
गेटमैन, लिखुहा,
पूर्वी गेलवे ।

(मरणोपरान्त)

25 अक्टूबर, 1969 को शाम के लगभग 6-10 बजे, जब कि सी०-251 अप हावड़ा-बर्दवान स्थानीय गाड़ी लिखुहा स्टेशन की ओर तेजी से आ रही थी, लेक्ल-बर्मिंग गेट नं० 1 ए में झूटी पर तैनात श्री रामप्यारे हरिजन, गेटमैन ने एक उद्ध मलिन तथा एक बालक को तेजी से आती हुई विद्युत गाड़ी का ध्यान किये बिना रेल की पटरों पार करते हुए देखा । यह देखकर कि वे गाड़ी के नीचे आने वाले हैं

अपने निजी सुरक्षा की परवाह न करते हुए श्री रामप्यारे तेजी से आगे बढ़ा और उस महिला और बालक को पटरों से दूर धकेल दिया । निमी में आती हुई विद्युत रेलगाड़ी के बलकुल तजदीक आ जाने से वह स्वयं पटरी से बाहर नहीं निकल सका और परिणाम स्वरूप गाड़ी के नीचे आ गया तथा उसकी मृत्यु हो गई । श्री रामप्यारे ने एक मनुष्य का जीवन बचाने के लिए अपना जीवन का बलिदान करके जिस अनुकरणीय साहस तथा प्रेरणादायक बीरता का परिचय दिया है, वह अन्धों के लिए भी प्रेरणा दायी रहगा ।

3. श्री नोजेर फिरोजशाह कोलाह,
पलौटिला इंजीनियर, बम्बई पोर्ट ट्रस्ट,
बम्बई ।

(मरणोपरान्त)

11 अगस्त, 1969 को जबकि बम्बई पोर्ट ट्रस्ट की कर्णनाव (टग) "अर्जुन" तुच्चर द्वीप में थी, उस समय श्री नोजेर फिरोजशाह कोलाह का ध्यान उस कर्णनाव के पोर्ट वायलर में हुए एक छिद्र की ओर गया । उस कर्णनाव को तत्काल बम्बई के प्रिमेज डाकमें लाया गया । इस कर्णनाव की मरम्मत के लिए घाट से बांधा जा रहा था कि "इंजन रूम" में एक भयानक विस्फोट हुआ । कुछ ही क्षणों में वायलर के भीतर की सभी सामग्री बाहर निकल आई और "इंजन रूम" का सारा 'स्टाक होल्ड' भर गया । श्री कोलाह तथा कुछ अन्य व्यक्ति बुरी तरह से झुलग गये तथा जल गये । श्री कोलाह दतनी बुरी तरह से घायल हो गये कि उनके सारे शरीर की त्वचा उनके शरीर से अलग लटकती हुई दिखायी दे रही थी । यद्यपि वह महान संकट में थे, फिर भी उन्होंने समीप बंधी हुई दूसरी कर्णनाव के इंजीनियर की मदद से 'स्टाक होल्ड' में फरो हुए एक अग्नि का को बचाने की कोशिश की । श्री कोलाह ने उस सुक्ष्मदंशक के प्रवेश-द्वार के समीप 'स्टाक होल्ड' में दिलाई देने वाली तार-रस्मी से बंधी हुई रस्मी को खींचने के लिए कहा ताकि सुरक्षा बाल्व में हील दी जा सके और इस प्रकार वाष्प-पान का तबाव कम हो सके । परन्तु इसमें सफलता नहीं मिली । दूसरे इंजीनियर के मुँह के सामने एक विस्फोट हुआ तथा रस्मी भी टूट गई । इसके बावजूद फरो हुए अग्नि का को बचाने के लिए श्री कोलाह ने अपने प्रयत्न जारी रखे । श्री नोजेर फिरोजशाह कोलाह की बाद में घावों के कारण मृत्यु हो गई ।

श्री नोजेर फिरोजशाह कोलाह ने अपनी निजी सुरक्षा की बिलकुल परवाह न करने हुए एक कार्य किया । स्वयं महान कष्ट में होते हुए भी एक श्रमिक का जीवन बचाने की उनकी नीति उत्कण्ठ अत्यन्त मगाहनीय है ।

4 श्री मुल्लक्कारा रमणकुट्टी नायर,
मुल्लक्कारा हाउस, ग्राम अम्बल्लूर,
पो० आफिस अलगप्पा नगर,
जिला त्रिचूर, केरल । (मरणोपरांत)

8 जनवरी 1970 को लगभग 6-45 बजे शाम को श्री मुल्लक्कारा रमणकुट्टी नायर तथा उनके परिवार के लोगों ने एक निकटवर्ती कुएं से चिल्लाने की आवाज सुनी। वे शीघ्र उस स्थान पर गये तथा उन्होंने देखा कि उनकी एक पड़ोसिन श्रीमती रोजी उस गहरे पानी में डूबने से बचने के लिए हाथ पैर मार रही थी। श्री नायर उसे बचाने के लिए तत्काल कुएं में कूदना चाहते थे किन्तु उनकी पत्नी ने उन्हें थोड़ी देर रुकने के लिए कहा तथा वह उनके लिए एक रस्सी लेने दौड़ी ताकि वह कुएं में जा सकें। किन्तु यह देखते हुए कि महिला जीवन के लिए संवर्धन कर रही है, श्री नायर रस्सी के लिए नहीं रुके तथा अक्लिम्ब कुएं में कूद पड़े। इस बीच अन्य पड़ोसी घटनास्थल पर पहुंच गये और उन्होंने श्रीमती रोजी को बचा लिया। किन्तु श्री मुल्लक्कारा रमणकुट्टी नायर के प्राण चले गये।

श्री मुल्लक्कारा रमणकुट्टी नायर ने एक अन्य डूबते हुए व्यक्ति को बचाने के प्रयास में स्वयं अपने जीवन का बलिदान कर दिया।

5. मास्टर कोचुथाप्पाथु वाके जार्ज,
कोचुथाप्पाथु वीडू, डाकघर मथोलापुरम,
ग्राम इलांजी, मुवात्तूपूझा तालुक,
जिला यन्किुलम, केरल । (मरणोपरांत)

7 जुलाई 1969 को सेंट पीटर्स हाई स्कूल इलांजी का एक विद्यार्थी मास्टर के० श्री० जार्ज, प्रसक्ती आयु 13 वर्ष श्री, अपने छोटे भाई के साथ अपने प्रांगण में था। तभी उसने देखा कि उसका एक पड़ोसी मित्र श्री के० श्री० शिवेन्द्रन जो एक निकटवर्ती तालाब में फिसल गया था, डूबने से बचने के लिए हाथ पैर मार रहा था। मास्टर जार्ज, अपने भाई को छोड़कर अपने डूबते हुए मित्र को बचाने के लिए तालाब में कूद पड़ा। किन्तु श्री शिवेन्द्रन उससे लिपट गया जिसके फलस्वरूप दोनों लड़के तालाब से डूबकर मर गये। मास्टर कोचुथाप्पाथु वाके जार्ज ने अपने पड़ोसी मित्र को बचाने के प्रयास में अनुकरणीय साहस का परिचय दिया।

सं० 51-प्रेज/70—निम्नलिखित व्यक्तियों को अपने लिये गंभीर शारीरिक चोट के संकट के बावजूद, साहस व तत्परता से, दूसरों के जीवन की रक्षा करने के लिए राष्ट्रपति जीवन रक्षा पदक प्रदान करने का अनुमोदन करने हैं :—

1. श्री रमण सूर्य राव,
ग्राम मंतूरु, रामपचोदवरम् तालुक,
पूर्वी गोदावरी जिला,
आंध्र प्रदेश।

29 जुलाई 1969 को मंतूरु ग्राम से दूर गोदावरी नदी में “झांसी रानी” नामक नाव एक जल-भंवर में फंस जाने से उलट गई। नदी में बाढ़ आई थी और 26 यात्री डूब गये। 9 कार्मिक और

12 यात्री जैमे-नंमे नदी के किनारे तक पहुंच अये। जल-भंवर में फंसे हुए कुछ लोग नदी के किनारे तक पहुंचने के लिए हाथ पैर मार रहे थे। एक साधारण श्रमिक, श्री रमण सूर्य राव, ने, जो दुर्घटना के समय नदी के किनारे पर था, एक आदमी को देखा, जो कि जल-भंवर से बाहर निकलने का विफल प्रयास कर रहा था। श्री राव ने पानी में बहते हुए लकड़ी का लट्ठा पकड़ लिया, जल-भंवर तक तैरता हुआ गया और उस व्यक्ति (श्री मोरा रामकृष्ण) को अपनी टांगें पकड़ा दीं और उसको भय नक जल-भंवर से बाहर निकालते हुए सुरक्षित रूप में नदी के किनारे ले आया। अपने निजी जीवन को होने वाले भारी खतरे की बिलकुल परवाह न करते हुए श्री रमण सूर्य राव ने श्री रामकृष्ण राव को डूबने से बचाने में उदाहरणीय साहस व महान सूक्ष्म-बुद्धि का परिचय दिया।

2. श्री मन्नेपल्ली श्रीनिवास राव,
लिपिक, प्रधान डाक घर,
नेल्लोर, आंध्र प्रदेश।

17 अक्टूबर 1969, को लगभग सुबह 11-45 बजे श्री मन्नेपल्ली श्री निवास राव ने, चिल्ला काल्व नदी, जिसमें बाढ़ आई थी, की पुलिया पार करने समय माथ माल के एक बच्चे को बाढ़ के बानी में बहते हुए देखा। आ कपड़े उतारने का ख्याल भी न करते हुए वे तत्काल नदी में कूद पड़े और महान सूक्ष्म-बुद्धि के साथ उस लड़के को बचा लाये। श्री राव की उपस्थिति और इस प्रकार के तत्परपूर्ण कार्य से ही वह लड़का डूबने से बच गया। बाढ़ की तेज धारा में अपने जीवन के लिए महान खतरे की परवाह न करते हुए, श्री मन्नेपल्ली श्रीनिवास राव ने भयानक बाढ़ में एक छोटे निमग्न लड़के का जीवन बचाने में विशिष्ट साहस एवं तत्परता का प्रदर्शन किया।

3. श्री दत्तात्रेय जगन्मनाथ रक्षे,
411, सोमवार पेठ,
मतारा नगर,
महाराष्ट्र।

डाक एवं तार विभाग के लाइनमैन श्री आत्माराम भुजबल को 19 अप्रैल 1969 को लगभग दो बजे दोपहर, जबकि वह एक खम्भे के ऊपर टेलीफोन की लाइनों की मरम्मत कर रहा था, बिजली का झटका लगा और वह बेहोश हो गया। मतारा नगर की एक व्यस्त गली में यह मार्ग से मर नीचे, लटक रहा था परन्तु वहां पर एकट्ठी भीड़ में से किसी ने भी उस लाइनमैन को बचाने के लिए आगे बढ़ने का साहस नहीं किया। उस समय जन स्वास्थ्य विभाग के श्री दत्तात्रेय जगन्नाथ रक्षे सड़क पर एक जीप में जा रहे थे। यह दुर्घटना देखकर वे तुरन्त अपनी जीप से उतरे आगे उस खम्भे पर चढ़कर विशेष साहस और कौशल से उन्होंने श्री आत्माराम भुजबल को बचा लिया। इसके पश्चात् श्री रक्षे उसे मरकायी अस्पताल में उपचार के लिए ले गये। यदि श्री दत्तात्रेय जगन्नाथ रक्षे अपने जीवन को खतरे में डालकर विशिष्ट साहस एवं तत्परता से काम न लेते तो सम्भवतः श्री भुजबल मर गया होता।

4. श्री अम्बलव न जय सीलन,
द्राग श्री रामचन्द्रन पिल्लई,
28, कोलकण्डी स्ट्रीट, बीमानगर,
तिरुचिरापली,
तमिल नाडू।

5. श्री तमिलमणि,
मुन्दरकोटई, मन्नारगुडी तालुक,
जिला तंजवूर,
तमिल नाडू।

13 दिसम्बर 1967 को श्रीमती विजयलक्ष्मी, जो मन्नारगुडी में पामिनी नदी में स्नान कर गयी थी, फिलसलकर नदी के तेज बहाव में बह गई। यह देखकर दो विद्यार्थी, सर्वश्री अम्बलवण् जयसीलन और तमिलमणि, अपनी निजी सुरक्षा की परवाह न करते हुए नदी में कूद पड़े, और उन्होंने श्रीमती विजयलक्ष्मी को डूबने से बचा लिया। दोनों विद्यार्थियों का यह निस्वार्थ कार्य विशेष सराहनीय है।

6. श्री लालचन्द हीरालाल धोबी,
45वीं बटालियन, केन्द्रीय आरक्षित पुलिस,
सुरक्षा महानिदेशालय,
मन्त्रिमंडल सचिवालय।

अक्तूबर 1968 में पश्चिम बंगाल के दार्जिलिंग, जलपाइगुड़ी और कूच-बिहार के पहाड़ी और मझानी क्षेत्रों में महान बगवादी करने वाली अभूतपूर्व बाढ़ के दौरान ग्राम फाजा, जिला जलपाइगुड़ी में श्री के० सी० सरकार के मकान में 5 अक्तूबर 1968 को टीस्ता नदी का पानी भर गया। श्री सरकार ने, जिन्हें थोड़ा तैरना आता था, सुरक्षित स्थान तक तैर कर जाने की कोशिश की परन्तु वह नदी के तेज भाव में फंस गये। केन्द्रीय आरक्षित पुलिस की 45वीं बटालियन के श्री लालचन्द हीरालाल धोबी ने श्री सरकार को उस स्थिति में देखा। अपने निजी जीवन की सुरक्षा की परवाह न करते हुए वह नदी में कूद पड़े। जैसे ही वह डूबते हुए व्यक्ति के पास पहुंचे तो कुछ समय तक एक ऐसा मालूम हुआ कि वे दोनों ही डूब जायेंगे परन्तु काफी प्रयत्न करने के पश्चात् श्री लालचन्द हीरालाल श्री सरकार को नदी के किनारे तक खींचकर लाने में सफल हुए। उन्होंने एक मानव के प्रति उच्चतम निस्वार्थ साहस और महान चिन्ता का परिचय दिया। उन्होंने अपने इस सामयिक और साहसपूर्ण कार्य से श्री सरकार को बचा लिया।

7. श्री चित्रपल्ली गोपाल सिंह,
ग्राम व डाकखाना दोहचनापल्ली,
बंगरपेट तालुक,
मैसूर।

26 दिसम्बर 1968 को कोलार सोना खनन अधिकरण की नन्दीद्रुग सोना खान में भूतल से 1600 मीटर से अधिक गहराई पर और नजदीकी पहुंच स्थान से 65 मीटर नीचे एक तिरछी शाफ्ट में चार व्यक्ति जमीन के नीचे फंस गये। इस शाफ्ट में वातावरण की स्थिति जटिल थी और दृश्यमानता भी कम थी। श्री चित्रपल्ली गोपाल सिंह एक रस्सी के सहारे 65 मीटर नीचे उतरे और व्यक्तियों को बचाने के पश्चात् उगी रस्सी के सहारे वह ऊपर चढ़ आये।

उस कार्य में बचाने वाले के जीवन के लिए महान संकट था क्योंकि एक भी गलत कदम उसे लगभग 600 मीटर नीचे शाफ्ट के तले में गिरा सकता था।

8. श्री शोलिगर मुनिस्वामी,
नं० 5, हेनरीज मेसनरी, 1-ब्लाक,
डाकखाना कोरोमंडल,
कोलार गोल्ड फील्ड,
मैसूर।

26 दिसम्बर 1968 को कोलार सोना खनन अधिकरण की नन्दीद्रुग सोना खान में भूतल से 1600 मीटर से अधिक गहराई पर और नजदीकी पहुंच स्थान से 65 मीटर नीचे एक तिरछी शाफ्ट में चार व्यक्ति जमीन के नीचे फंस गये। इस शाफ्ट में वातावरण की स्थिति जटिल थी और दृश्यमानता भी कम थी। श्री शोलिगर मुनिस्वामी ने अपने शाफ्ट के साथ एक सेफ्टी रोप पर 65 मीटर तिरछे फामले तक नीचे भेजे जाने के लिए स्वयं को पेश किया ताकि शाफ्ट, केज आदि के बारे में सूचना प्राप्त की जा सके और यह सूचना उस केज में फंसे हुए व्यक्तियों को बचाने के उपाय की खोज के लिए आवश्यक थी। उन्होंने अपने जीवन को भारी खतरे में डालते हुए यह काम किया, अन्यथा, एक भी गलत कदम उसे लगभग 600 मीटर नीचे शाफ्ट के तले में गिरा सकता था।

9. श्री दोहूर जयराम,
दोहूर ग्राम, डाकघर बंगार गेट,
मैसूर।

26 दिसम्बर, 1968 को कोलार सोना खनन अधिकरण की नन्दीद्रुग सोना खान में भूतल से 1600 मीटर से अधिक गहराई पर और नजदीकी पहुंच स्थान से 65 मीटर नीचे एक तिरछी शाफ्ट में चार व्यक्ति जमीन के नीचे फंस गये। इस शाफ्ट में वातावरण की स्थिति जटिल थी और दृश्यमानता कम थी। श्री दोहूर जयराम ने अपने शाफ्ट के साथ एक सेफ्टी रोप पर 65 मीटर तिरछी दूरी तक नीचे उतारे जाने के लिये और उन चार आदमीयों के तेज तक पहुंचने के लिये स्वयं को पेश किया। इस कार्य में बचाने वाले के जीवन के लिये महान संकट था, अन्यथा एक भी गलत कदम उसे लगभग 600 मीटर नीचे शाफ्ट के तले में गिरा सकता था।

10. श्री रमन हरी चौधरी,
आवरसीयर, रोड प्रोजेक्ट सब-डिवीजन,
नं० 1, आगरा रोड, धुलिया
महाराष्ट्र।

28 मई, 1966 की शाम को यात्रियों की एक देशी मास्र भीमा नदी पार करते हुए अचानक आंधी आने के कारण, जिला अहमदनगर में धोद के समीप उलट गई और सारे यात्री गहरे पानी में गिर गये। श्री रमन हरी चौधरी, ने, जो स्नान करने के पश्चात नदी के किनारे पर खड़े हुए थे बिपदग्रस्त व्यक्तियों की पुकार सुनी। वह तुरन्त पानी में कूद पड़े और दो दफे में तीन व्यक्तियों को नदी के दूसरे किनारे पर सुरक्षित पहुंचा दिया, जबकि ऐसा करने में उन्हें कई जगह चोट लगी। अपने निजी जीवन को खतरे में डालते हुए यदि श्री रमन हरी चौधरी विभिन्न साहस और तत्परता न दर्शाते तो वह तीनों व्यक्ति डूबकर मर गये होते।

11. श्री गोपीनाथ दाम, स्वयं सेवक,
एस० एस० बी०, सुरक्षा महानिदेशालय,
मंत्रिमंडल सचिवालय ।
12. श्री गोसाई दाम मलिक, स्वयं सेवक
एस० एस० बी०, सुरक्षा महानिदेशालय
मंत्रिमंडल सचिवालय ।
13. श्री राधेष्णाम सरकार, स्वयं सेवक
एस० एस० बी०, सुरक्षा महानिदेशालय,
मंत्रिमंडल सचिवालय ।
14. श्री अनुल प्रसाद राय चौधरी, स्वयं सेवक,
एस० एस० बी०, सुरक्षा महानिदेशालय,
मंत्रिमंडल सचिवालय ।
15. श्री परेश चन्द्र राय, स्वयं सेवक,
एस० एस० बी०, सुरक्षा महानिदेशालय
मंत्रिमंडल सचिवालय ।
16. श्री सन्तोष मिर्दा, स्वयं सेवक,
एस० एस० बी०, सुरक्षा महानिदेशालय,
मंत्रिमंडल सचिवालय ।
17. श्री नाथूराम सरकार, स्वयं सेवक,
एस० एस० बी०, सुरक्षा महानिदेशालय,
मंत्रिमंडल सचिवालय ।

अक्तूबर 1968 में पश्चिम बंगाल के दार्जिलिंग, जलपाईगुड़ी और कूच-बिहार के पहाड़ी और मैदानी क्षेत्रों में आई अभूतपूर्व बाढ़ के दौरान जन, सम्पत्ति एवं जानवरों की अत्यधिक बर्बादी हुई थी। यदि एस० एस० बी० के स्थानीय कार्यकर्ता सर्वेधी गोपीनाथ दाम, गोसाई दाम मलिक, राधेष्णाम सरकार, अनुल प्रसाद राय चौधरी, परेशचन्द्र राय, सन्तोष मिर्दा और नाथूराम सरकार बचाव संबंधी कामों में स्वेच्छा और साहसपूर्वक न लगते तो बहुत अधिक जानें जातीं। अपने निजी जीवन की भारी खर्च में डालते हुए, उन्होंने 88 व्यक्तियों को बचाया, जिनमें स्त्रियां और बच्चे भी थे, जो नदी में बह रहे थे और निःसहाय स्थिति में नदी के किनारे फँस गये थे। एक काम चलाऊ बेड़े की सहायता से वे लगातार चार दिन तक काम करते रहे और लोगों को सुरक्षित स्थानों में पहुँचाने और उनके जीवन की रक्षा करने में सफल हुए। जो व्यक्ति इस प्राकृतिक मुगीबत से बच गये थे उनके लिये उन्होंने राहत और सहायता कार्य का आयोजन किया।

प्रत्येक ने स्वैच्छिक रूप से बचाव संबंधी काम को पूरा करने के लिये अतिनीय साहस, अथक शक्ति और उच्चमनरीय कर्तव्य परायणता का परिचय दिया।

18. सैकण्ड लेफ्टिनेंट परपोत्तम दत्त शर्मा (एस० एस० 20314),
आर्टिलरी, 191 भाऊदेन रेजीमेंट,
डारा 56 ए० पी० ओ० ।

30 जनवरी, 1969 को सैकण्ड लेफ्टिनेंट परपोत्तम दत्त शर्मा 41 अन्य सैनिकों के साथ नेफ्रा के जिला कामेंग में तेगा नदी पर बने लकड़ी के एक संकरे पुल को पार करने की प्रतीक्षा में थे। पुल लकड़ी के दो लट्ठों का बना हुआ था, और एक गमय एक या

दो व्यक्तियों से अधिक उसके ऊपर नहीं चल सकते थे। अचानक दो सिपाही फिसल कर गहरी नदी में जा गिरे। नदी की तेज धारा ने उनमें से एक को पत्थरों की ओर बहा दिया। उसे तैरना नहीं आता था, और उसके कंधे पर भारी उपकरण और राइफल थी।

सैकण्ड लेफ्टिनेंट शर्मा बड़े साहस और वीरता के साथ नदी में कूदकर डूबते हुए व्यक्ति की ओर तैर कर गये। अत्यधिक प्रयत्न और क्षमता के साथ वे डूबते हुए सिपाही को बचा लाये। साम लेने के लिये एक क्षण भी रुके बिना सैकण्ड लेफ्टिनेंट शर्मा दुबारा पुल की ओर गये और मानवातीत प्रयत्न में दूसरे व्यक्ति को भी पुल तक खींचा।

अपनी जान की बिल्कुल परवाह न करते हुए, सैकण्ड लेफ्टिनेंट परपोत्तम दत्त शर्मा, अपने साहस व सूझ-बूझ से दो सिपाहियों का जीवन बचाने में सफल हुए।

19. श्री रणजीत सिंह,
उप-निरीक्षक, रेलवे सुरक्षा दल,
पश्चिम रेलवे ।
20. श्री रमेश चन्द्र शर्मा,
उप-निरीक्षक लवे सुरक्षा दल,
पश्चिमी रेलवे ।
21. श्री चैतन्य देव बनर्जी,
उप-निरीक्षक, रेलवे सुरक्षा दल,
पूर्वी रेलवे, कलकत्ता ।

रात भर वर्षा होते रहने से 6 अगस्त, 1968 को सुबह तक चिपवाड़ और जगन्नाथ मन्दिर में पानी दस फुट ऊंचा चढ़ गया। वर्षा के कारण स्थानीय जनता, उनके मकानों और पशुओं की भारी मृत्वीबत पहुँची थी, लगभग 158 व्यक्तियों ने जिनमें बूढ़े, स्त्री-पुरुष और बच्चे भी शामिल थे, ऊँचे मकानों की छतों पर शरण ली। उन्हें बचाने के लिये रेलवे सुरक्षा दल के तीन दल उप-निरीक्षक रणजीत सिंह, रमेश चन्द्र शर्मा और चैतन्य देव बनर्जी के नेतृत्व में तैनात किये गये। चूँकि तारों तत्काल उपलब्ध नहीं थी, इन दलों ने तेल के खाली ड्रमों की एक नाव-सी बना ली, परन्तु बाढ़ के बढ़ते हुए पानी और तेज बहाव के कारण उसे उस स्थान तक नहीं ले जा सके, जहाँ पर आपत्तिग्रस्त ऐसे व्यक्ति खड़े थे, जिनका जीवन भारी खर्च में बड़ा हुआ था। आपत्तिग्रस्तों के पास पहुँचने का कोई उपाय न देखते हुए वे अपने निजी जीवन की सुरक्षा की बिल्कुल परवाह न करते हुए बाढ़ में कूद पड़े और ड्रमों के साथ बंधी रस्सी के सहारे तैर कर उन आपत्तिग्रस्त व्यक्तियों के पास पहुँचे और उन सभी व्यक्तियों को बचाने में सफल हुए।

उप-निरीक्षक रणजीत सिंह, रमेशचन्द्र शर्मा, और चैतन्य देव बनर्जी ने 158 व्यक्तियों की जान बचाने में विनिष्ट साहस, निःस्वार्थ भावना एवं तत्परता का प्रदर्शन किया।

22. श्री बी० एन० दाम,
उप-निरीक्षक रेलवे सुरक्षा दल,
दक्षिण-पूर्व रेलवे ।

बुलमर के निचले जलाके में स्थित धारावाड़ उपनगर में 6 अगस्त 1968 को सवेरे बाढ़ का पानी लगभग 10 फुट ऊंचा चढ़ गया। यद्यपि वहाँ के बहुत गाँव निवासी वहाँ से बाहर

निकल गये, बाढ़ के चढ़ते हुए पानी और तेज बहाव के कारण अति नितियों और लकड़ों का, जो एक मकान की छत पर घिरे हुए थे, वंच निकलना कठिन हो गया। उप-निरीक्षक श्री बी० एन० दाम के अधीन रखे गुरुआ दल की एक टुकड़ी उस क्षेत्र की ओर तैनात नहीं। उस समय तक बाढ़ का पानी मकान की छत तक आ पहुँचा था। इन घिरे व्यक्तियों को बचाने के लिये कोई नाव या बोट आदि न मिला। ऐसी स्थिति में अपने निजी जीवन की सुरक्षा की परवाह न करते हुए श्री दाम बाढ़ के पानी में कूद पड़े और बंधरदार धारा में तैर कर उस मकान तक पहुँचे, जहाँ वे व्यक्ति घिरे हुए थे। रस्मियों से बचाये गये भाग के सहारे, और गुरुआ-दल के अन्य व्यक्तियों की सहायता से श्री दाम ने उन सब आठ व्यक्तियों को बचा लिया।

उन आपत्तिग्रस्त व्यक्तियों का जीवन बचाने में श्री बी० एन० दाम ने असाधारण साहस और निःस्वार्थ कर्तव्य-परायणता का परिचय दिया।

23. श्री मरान,

कोक्कूभूपरम्बल हाउस, कोट्टिलंगडी अम्मम,
पेरिटलमन्ना तालुक, मलापुरम जिला,
केरल।

14 नवम्बर, 1969 की सुबह 10 बजे मलापुरम में, माना-वार विशेष पुलिस की सी० कम्पनी के सिपाही सं० 2617 श्री वल्लीज की पत्नी, नूरडी (कडलूडी) नदी में स्नान करने समय अचानक फिसल जाने से नदी के 10 फुट गहरे पानी में गिर गई। तेज बहाव के कारण वह अपने को संभाल न सकी और धारा में ब गई। वहाँ खड़ी औरतों की चीख-पुकार सुनकर श्री मरान जो नदी के किनारे बांस काट रहा था, अपनी जान को खतरे में डालकर, तुरन्त नदी में कूद पड़ा और उस औरत को बेहोशी की अवस्था में किनारे पर ले आया। यदि श्री मरान यह तत्परता न दिखाने तो उस औरत की नूरडी पूल के खम्भों में टकराकर मृत्यु होने की हर सम्भावना थी।

सं० 52 प्रेज/70—राष्ट्रपति तमिल नाडू पुलिस के निम्नांकित अधिकारी को उसकी वीरता के लिये पुलिस पदक प्रदान करते हैं :—

अधिकारी का नाम तथा पद

श्री सुबैया नाडर रामस्वामी,
पुलिस कांस्टेबल 2166,
तिरुनेलवेली जिला,
तमिल नाडू।

(स्वर्गीय)

सेवाओं का विवरण जिनके लिए पदक प्रदान किया गया।

1 जनवरी, 1969 की रात्रि को श्री सुबैया नाडर रामस्वामी को एक अन्य कांस्टेबल के साथ रात को गश्ती ड्यूटी पर तैनात किया गया। 5 जनवरी, 1969 को प्रातः लगभग साढ़े तीन बजे उन्होंने कोक्कीगकुलम में एक व्यक्ति को एक मन्दूक लेजाते हुए देखा जिसका बाद में पता लगा कि वह तिरुनेलवेली के राजामनीकम नामक व्यक्ति के घर से चुराया गया था। पुलिस को संदेह हुआ और उन्होंने उस व्यक्ति से संदूक को खोल कर दिखाने को कहा। आशंक्य व्यक्ति

ने संदूक नीचे फेंक दिया तथा पाम के धान के खेतों में भाग गया। श्री रामस्वामी ने अपनी बंदूक हमारे कांस्टेबल के पास छोड़ दी और निहत्थे ही धान के खेतों में आशंक्य व्यक्ति का पीछा किया। फिर उसने अपने जाँखम की परवाह न करते हुए उस खतरनाक अपराधी से हाथापाई की जिसने कि अपने बचाव के लिये घातक प्रयत्न में रामस्वामी के गले में छुरा घोंप दिया और भाग गया। बाद में श्री रामस्वामी का शव पुलिस तलामा दल को धान के खेतों में मिला। श्री रामस्वामी ने निहत्थे ही निजी खतरे की परवाह न करते हुए घातक अपराधी के साथ हाथापाई में अपनी जान दे दी।

श्री सुबैया नाडर रामस्वामी ने उत्कृष्ट साहस और कर्तव्य परायणता दिखाई और अपने कर्तव्य का पालन करते हुए अपनी जान दे दी।

2. यह पदक पुलिस पदक नियमावली के नियम 4 (i) के अन्तर्गत वीरता के लिये दिया जा रहा है तथा फलस्वरूप नियम 5 के अन्तर्गत विशेष स्वीकृत भत्ता भी दिनांक 5 जनवरी, 1969 में दिया जायेगा।

सं० 53 प्रेज/70—राष्ट्रपति केन्द्रीय आरक्षित पुलिस के निम्नांकित अधिकारी को उसकी वीरता के लिये पुलिस पदक प्रदान करते हैं :—

अधिकारी का नाम तथा पद

श्री पी० आर० सिंह,
कमांडेंट,

38वीं बटालियन, केन्द्रीय आरक्षित पुलिस।

सेवाओं का विवरण जिनके लिए पदक प्रदान किया गया।

जुलाई, 1969 में विद्रोहियों ने भारत-पाकिस्तान सीमा के समीप बुलंगपामा गांव के बाजार को आग लगा दी, सम्पत्ति लूटी और घोर अत्याचार किये। 22 जुलाई, 1969 को श्री पी० आर० सिंह को विद्रोहियों का रोकने और उनका सामना करने के लिये तैनात किया गया। 23 जुलाई, 1969 को रात्रि में लगभग साढ़े बारह बजे पुलिस दल गंडाचेरा पुलिस थाने में पहुँचा, जिस यात्रा में एक ऐसी सड़क से भी गुजरना था, जिस पर जीप मुश्किल से चल सकती थी और भारी वर्षा के कारण सड़क फिसलन वाली व कीचड़दार हो गई थी। गंडाचेरा पुलिस थाने में पहुँचने पर उन्हें सूचना मिली कि विद्रोही रात को थाने पर आक्रमण करने वाले हैं। 23 जुलाई, 1969 को प्रातः लगभग 1-00 बजे कोई 100-150 विद्रोहियों ने 3.5" राकेटों, स्वचालित राइफलों और मोटरों से पुलिस थाने पर आक्रमण कर दिया। यद्यपि पुलिस दल की संख्या बहुत कम थी, तथापि श्री सिंह ने पुलिस कर्मचारियों में विश्वास पैदा किया तथा विद्रोहियों को खदेड़ दिया। पुलिस थाने को हथियाने के अपने प्रयत्न में असफल होने के बाद विद्रोहियों ने उस क्षेत्र के सहकारी इमारत और अन्य इमारतों के समीप की कुछ झोपड़ियों में आग लगाने का प्रयत्न किया और उस पहाड़ी पर चढ़ गये जिन पर ये इमारतें स्थित थीं। वहाँ भी श्री सिंह ने फिर अपने आदमियों को उपयुक्त स्थान पर तैनात करके आक्रमण का मुकाबला करने के लिये प्रेरित किया तथा स्वयं अपनी निजी सुरक्षा की परवाह न करते हुए उस स्थान की ओर बढ़े जहाँ आग लगी हुई थी, बहुमूल्य वस्तुओं

को निकाल लाये और आग बुझा दी। विद्रोहियों का उत्साह पूर्णतः भंग हो गया और वे जंगल की ओर लौट गये। इस प्रकार उन्होंने साहसपूर्ण निष्चय, असाधारण नेतृत्व और उत्कृष्ट पराक्रम से विद्रोहियों के प्रयत्नों को विफल कर दिया।

श्री मो० आर० मिह ने विद्रोहियों का सामना करने में उत्कृष्ट कर्तव्य परायणता और अनुकरणीय साहस दिखाया।

2. यह पदक पुलिस पदक नियमावली के नियम 4(i) के अन्तर्गत बीरता के लिये दिया जा रहा है।

पै० ना० कृष्ण मणि,
राष्ट्रपति के संयुक्त सचिव

रेल संवालय (रेलवे बोर्ड)

नई दिल्ली, दिनांक 24 अक्टूबर 1970

नियम

मं० 70 ई० (जी० आर०) 1-20/1—यांत्रिक इन्जीनियरों की भारतीय रेल सेवा में विशेष श्रेणी अप्रेंटिमेंटों के रूप में नियुक्ति के लिये उम्मीदवारों का चयन करने के उद्देश्य से संघ लोक सेवा आयोग द्वारा 1971 में ली जाने वाली प्रतियोगिता परीक्षा के नियम आम जानकारी के लिये प्रकाशित किये जाते हैं।

2. परीक्षा-परिणामों के आधार पर भारी जाने वाली रिक्तियों की संख्या का उल्लेख आयोग द्वारा जारी की जाने वाली सूचना में किया जायेगा अनुसूचित जातियों तथा अनुसूचित आदिम जातियों के उम्मीदवारों के सम्बन्ध में रिक्तियों का आरक्षण भारत सरकार द्वारा नियत संख्या में किया जायेगा।

अनुसूचित जातियों/आदिम जातियों से अभिप्राय है कोई भी ऐसी जाति/आदिम जाति जिसका उल्लेख अनुसूचित जातियों/आदिम जातियों से अभिप्राय है कोई भी ऐसी जाति/आदिम जाति जिसका उल्लेख संविधान (अनुसूचित जाति) आदेश 1950, संविधान (अनुसूचित जाति) (भाग के राज्य) आदेश 1951, संविधान (अनुसूचित आदिम जाति) आदेश 1950 और बम्बई पुनर्गठन अधिनियम 1960 और पंजाब पुनर्गठन अधिनियम 1966 के साथ पठित अनुसूचित जाति और अनुसूचित आदिम जाति सूची (अशोधन) आदेश 1956 द्वारा यथा संशोधित संविधान (अनुसूचित आदिम जाति) (भाग ग के राज्य) आदेश, 1951, संविधान (जम्मू और काश्मीर) अनुसूचित जाति आदेश, 1956, संविधान (अंडमान और निकोबार द्वीप) अनुसूचित आदिम जाति आदेश 1959, संविधान (दादरा और नगर हवेली) अनुसूचित जाति, आदेश, 1962, संविधान (दादरा और नगर हवेली) अनुसूचित आदिम जाति 1962 संविधान (पांडिचेरी) अनुसूचित जाति आदेश, 1964, संविधान, (अनुसूचित जातियाँ) (उत्तर प्रदेश) आदेश, 1967, संविधान (गोआ, दमन, और दीव) अनुसूचित, जाति आदेश, 1968, और संविधान, (गोआ, दमन और दीव), अनुसूचित आदिम जाति आदेश, 1968 के साथ पठित अनुसूचित जाति/आदिम जाति सूची (संशोधन) आदेश, 1956 में किया गया है।

3. इन नियमों के अन्तर्गत परीक्षा आयोग द्वारा इन नियमों के परिशिष्ट I में निर्धारित ढंग से ली जायेगी।

परीक्षा-स्थल तथा परीक्षा की तारीखें आयोग द्वारा नियत की जायेंगी।

4. उम्मीदवार के लिये आवश्यक होगा कि वह या तो :-

(क) भारत का नागरिक हो, या

(ख) मिक्कम का प्रजा हो, या

(ग) नेपाल की प्रजा हो, या

(घ) भूटान की प्रजा हो, या

(ङ) तिब्बती शरणार्थी हो, भारत में स्थाई रूप में बसने के द्वावे में, पहली जनवरी, 1962 से पहले भारत आया हो, या

(च) वह व्यक्ति जो मूलतः भारतीय हो और भारत में स्थायी रूप में बसने के द्वावे में पाकिस्तान, बर्मा, श्री लंका और पूर्वी अफ्रीका के केन्या, उगान्दा तथा तन्जानिया के संयुक्त गणराज्य के (भूतपूर्व तांगानिका और जंजीबार) देशों से प्रव्रजन करके भारत आया हो;

परन्तु उपर्युक्त वर्ग (ग), (घ), (ङ) और (च) का उम्मीदवार वह होगा जिसे भारत सरकार द्वारा पात्रता-प्रमाण-पत्र दिया गया हो।

लेकिन निम्नलिखित में से किसी भी कोटि के उम्मीदवारों के मामले में पात्रता-प्रमाण-पत्र की आवश्यकता नहीं होगी।

(i) वे व्यक्ति जो 19 जुलाई, 1948 के पहले पाकिस्तान से प्रव्रजन करके भारत आये हों और तब से साधारणतः भारत में रह रहे हों ;

(ii) वे व्यक्ति जो 19 जुलाई, 1948 को या उसके बाद पाकिस्तान से प्रव्रजन करके भारत आये हों और जिन्होंने संविधान के अनुच्छेद 6 के अधीन अपने को भारतीय नागरिक के रूप में रजिस्टर करा लिया हो।

(iii) उपर्युक्त कोटि (च) के नागरिकेतर व्यक्ति जो संविधान लागू होने अर्थात् 26 जनवरी, 1950 से पहले भारत सरकार के अधीन सेवा में आ गये हों और तब से बिना व्यवधान के इस सेवा में चले आ रहे हों। लेकिन यदि ऐसा कोई व्यक्ति 26 जनवरी, 1950 के बाद सेवा व्यवधान के पश्चात् फिर सेवा सेवा में आया हो या आये तो उसके लिये यथारिति पात्रता-प्रमाण-पत्र देना आवश्यक होगा।

जिस उम्मीदवार के मामले में पात्रता-प्रमाण-पत्र आवश्यक हो, उसे परीक्षा में बैठने दिया जा सकता है, और अन्तिम रूप से उसकी नियुक्ति की जा सकती है, बशर्ते कि सरकार उसे आवश्यक प्रमाण-पत्र दे।

5. (क) उम्मीदवारों के लिये आवश्यक है कि उसकी आयु 1 जनवरी, 1971 को 16 वर्ष हो चुकी हो लेकिन 19 वर्ष न हुई हो अर्थात् वह 2 जनवरी, 1952 से पहले और 1 जनवरी, 1955 के बाद पढ़ा न हुआ हो।

(ख) ऊपर निर्धारित अधिकतम आयु सीमा में निम्नलिखित छूट दी जा सकेगी :-

(1) यदि उम्मीदवार अनुसूचित जाति या अनुसूचित आदिम जाति का हो, तो अधिक से अधिक पाँच वर्ष तक।

- (2) यदि उम्मीदवार पूर्वी पाकिस्तान से आया हुआ सदाशयी विस्थापित व्यक्ति हो और 1 जनवरी, 1964 को या उसके बाद प्रव्रजन करके भारत आया हो, तो अधिक से अधिक तीन वर्ष तक, लेकिन यह रियायत किसी ऐसे उम्मीदवार के लिये स्वीकार्य नहीं होगी जो ऐसी पिछली तीन परीक्षाओं में बैठ चुका हो ;
- (3) यदि उम्मीदवार अनुसूचित जाति या अनुसूचित आदिम जाति का हो और साथ ही पूर्वी पाकिस्तान से आया हुआ सदाशयी विस्थापित व्यक्ति हो और 1 जनवरी, 1964 को या उसके बाद प्रव्रजन करके भारत आया हो, तो अधिक से अधिक आठ वर्ष तक। लेकिन यह रियायत किसी ऐसे उम्मीदवार के लिए स्वीकार्य नहीं होगी जो ऐसी पिछली आठ परीक्षाओं में बैठ चुका हो ;
- (4) यदि उम्मीदवार पांडिचेरी के संघ क्षेत्र का निवासी हो और उसने किसी समय फ्रेंच भाषा के माध्यम से शिक्षा पायी हो, तो अधिक से अधिक तीन वर्ष तक ;
- (5) यदि उम्मीदवार भारतीय मूल का, श्रीलंका से आया हुआ सदाशयी प्रत्यावर्ती हो और अक्टूबर, 1964 के भारत-श्रीलंका करार के अधीन 1 नवम्बर, 1964 को या इसके बाद प्रव्रजन करके भारत आया हो, तो अधिक से अधिक तीन वर्ष तक। लेकिन यह रियायत किसी ऐसे उम्मीदवार के लिए स्वीकार्य नहीं होगी, जो ऐसी तीन परीक्षाओं में बैठ चुका हो ;
- (6) यदि उम्मीदवार अनुसूचित जाति या अनुसूचित आदिम जाति का हो और साथ ही भारतीय मूल का, श्रीलंका से आया हुआ सदाशयी प्रत्यावर्ती हो तथा अक्टूबर, 1964 के भारत-श्रीलंका करार के अधीन 1 नवम्बर, 1964 को या इसके बाद प्रव्रजन करके भारत आया हो, तो अधिक से अधिक आठ वर्ष तक। लेकिन यह रियायत किसी ऐसे उम्मीदवार के लिए स्वीकार्य नहीं होगी जो ऐसी पिछली आठ परीक्षाओं में बैठ चुका हो ;
- (7) यदि उम्मीदवार गोआ, दमन और दिव संघ क्षेत्र का निवासी हो ; तो अधिक से अधिक तीन वर्ष तक ;
- (8) यदि उम्मीदवार भारतीय मूल का हो और केन्या उगान्दा और तंजानिया के संयुक्त गणराज्य (भूतपूर्व तांगानिका और जनजीबार से प्रव्रजन करके भारत आया हो, तो अधिक से अधिक तीन वर्ष तक ;
- (9) यदि उम्मीदवार भारतीय मूल का वर्मा से आया हुआ सदाशयी प्रत्यावर्ती हो और 1 जून, 1963 को या इसके बाद प्रव्रजन करके भारत आया हो, तो अधिक से अधिक तीन वर्ष तक। लेकिन यह रियायत किसी ऐसे उम्मीदवार को स्वीकार्य नहीं होगी जो ऐसी पिछली तीन परीक्षाओं में बैठ चुका हो ;

- (10) यदि उम्मीदवार अनुसूचित जाति या अनुसूचित आदिम जाति का हो और साथ ही भारतीय मूल का वर्मा से आया हुआ सदाशयी प्रत्यावर्ती हो तथा 1 जून, 1963 को या इसके बाद प्रव्रजन करके भारत आया हो, तो अधिक से अधिक आठ वर्ष तक। लेकिन यह रियायत किसी ऐसे उम्मीदवार को स्वीकार्य नहीं होगी जो ऐसी पिछली आठ परीक्षाओं में बैठ चुका हो।
- (11) किसी अन्य देश के साथ युद्ध के दौरान उपद्रवग्रस्त क्षेत्र में अपाहिज हो जाने के फलस्वरूप मुक्त हुए सैनिक कर्मचारियों के मामले में अधिक से अधिक तीन वर्ष तक। लेकिन यह रियायत किसी ऐसे उम्मीदवार को स्वीकार्य नहीं होगी जो ऐसी पिछली तीन परीक्षाओं में बैठ चुका हो।
- (12) किसी अन्य देश के साथ युद्ध के दौरान उपद्रवग्रस्त क्षेत्र में अपाहिज हो जाने के फलस्वरूप मुक्त हुए अनुसूचित जाति या अनुसूचित आदिम जाति के सैनिक कर्मचारियों के मामले में अधिक से अधिक आठ वर्ष तक। लेकिन यह रियायत किसी ऐसे उम्मीदवार को स्वीकार्य नहीं होगी जो ऐसी पिछली आठ परीक्षाओं में बैठ चुका हो।

उपयुक्त उपबंधों के अतिरिक्त किसी भी हालत में निर्धारित आयु-सीमाओं में छूट नहीं दी जायेगी।

6. उम्मीदवार ने :—

- (क) भारत सरकार द्वारा अनुमोदित किसी विश्वविद्यालय या बोर्ड की इंटरमीडिएट अथवा समकक्ष परीक्षा प्रथम या द्वितीय श्रेणी में पास की हो जिसमें गणित के साथ भौतिकी और रसायन विज्ञान में से कम से कम एक विषय उसकी परीक्षा के विषयों में रहा हो।

जिन स्नातकों ने डिग्री परीक्षा में गणित के साथ भौतिकी और रसायन विज्ञान विषयों में से कम से कम एक विषय लिया हो, वे भी आवेदन-पत्र भेज सकते हैं; या

- (ख) किसी विश्वविद्यालय के तीन वर्ष के डिग्री पाठ्यक्रम के अन्तर्गत प्रथम वर्ष की परीक्षा या ग्रामीण उच्चतर शिक्षा की राष्ट्रीय परिषद् की ग्रामीण सेवाओं में तीन वर्ष के डिप्लोमा पाठ्यक्रम की प्रथम परीक्षा पास की हो जिसमें गणित के साथ भौतिकी और रसायन विज्ञान में से कम से कम एक विषय रहा हो लेकिन शर्त यह है कि डिग्री/डिप्लोमा पाठ्यक्रम शुरू करने से पहले उसने उच्चतर माध्यमिक परीक्षा या विश्वविद्यालय-पूर्व/या समकक्ष परीक्षा प्रथम या द्वितीय श्रेणी में पास की हो अथवा कम से कम पांच क्रेडिट सहित (जिनमें गणित में प्राप्त क्रेडिटों के साथ भौतिकी और रसायन विज्ञान में प्राप्त क्रेडिट भी शामिल हैं)। केम्ब्रिज स्कूल सर्टिफिकेट/इंडियन स्कूल सर्टिफिकेट प्राप्त किया हो।

जिन उम्मीदवारों ने तीन वर्षीय पाठ्यक्रम के अन्तर्गत प्रथम/द्वितीय वर्ष की परीक्षा प्रथम या द्वितीय श्रेणी में गणित के साथ भौतिकी और रसायन विज्ञान में से किसी एक विषय के साथ पास की हो, आवेदन पत्र भेज सकते हैं, लेकिन शर्त यह है कि प्रथम और द्वितीय वर्ष की परीक्षा किसी विश्वविद्यालय द्वारा ली गई हो।

- (ग) दिल्ली पालीटेक्नीक दिल्ली या भारत सरकार द्वारा अनुमोदित किसी विश्वविद्यालय की पूर्व-इंजीनियरी परीक्षा प्रथम या द्वितीय श्रेणी में पास की हो;
- (घ) किसी भारतीय विश्वविद्यालय या मान्यता प्राप्त बोर्ड की पूर्व व्यावसायिक/पूर्व तकनीकी परीक्षा जो उच्चतर माध्यमिक या पूर्व विश्वविद्यालय स्तर के एक वर्ष बाद ली गयी हो, प्रथम या द्वितीय श्रेणी में पास की हो और परीक्षा के विषयों में गणित के साथ भौतिकी और रसायन विज्ञान में से कम से कम एक परीक्षा का विषय रहा हो।
- (ङ) किसी विश्वविद्यालय के पांच वर्षीय इंजीनियरी डिग्री पाठ्यक्रम के अन्तर्गत प्रथम वर्ष की परीक्षा पास की हो, लेकिन शर्त यह है कि डिग्री पाठ्यक्रम शुरू करने से पहले उसने उच्चतर माध्यमिक परीक्षा या पूर्व विश्वविद्यालय या समकक्ष परीक्षा प्रथम या द्वितीय श्रेणी में पास की हो या कम से कम पांच क्रेडिट सहित (जिनमें गणित में प्राप्त क्रेडिट के साथ भौतिकी और रसायन विज्ञान में से किसी एक में प्राप्त क्रेडिट भी शामिल हैं) कैम्ब्रिज स्कूल सर्टिफिकेट/इंडियन स्कूल सर्टिफिकेट प्राप्त हो।

जिन उम्मीदवारों ने पांच वर्षीय इंजीनियरी डिग्री पाठ्यक्रम की प्रथम वर्ष की परीक्षा प्रथम या द्वितीय श्रेणी में पास की हो, वे भी आवेदन पत्र भेज सकते हैं, लेकिन शर्त यह है कि प्रथम वर्ष की परीक्षा विश्वविद्यालय द्वारा ली गयी हो।

नोट 1 :—जिन उम्मीदवारों को विश्वविद्यालय या बोर्ड द्वारा इंटरमीडिएट या उपर्युक्त किसी अन्य परीक्षा में कोई विशिष्ट श्रेणी न दी गयी हो, उन्हें भी शैक्षणिक दृष्टि से पात्र समझा जायेगा लेकिन शर्त यह है कि उनके प्राप्तांकों का कुल योग सम्बन्धित विश्वविद्यालय/बोर्ड द्वारा निर्धारित प्रथम या द्वितीय श्रेणी के अंकों की सीमा में हो।

नोट 2 :—कोई ऐसा उम्मीदवार जो कि ऐसी परीक्षा में बैठ चुका है जिसे पास करने से वह इस परीक्षा में बैठने का पात्र बनता है लेकिन जिसके परीक्षा फल की सूचना उसे नहीं मिली है, वह इस परीक्षा में प्रवेश के लिए आवेदन पत्र दे सकता है; यदि कोई उम्मीदवार किसी ऐसी अर्हक परीक्षा में बैठना चाहता है तो वह भी आवेदन पत्र दे सकता है, लेकिन शर्त यह है कि अर्हक परीक्षा इस परीक्षा के प्रारम्भ होने से पहले समाप्त हो जाये। ऐसे उम्मीदवार को, यदि वह अन्यथा पात्र हो, तो परीक्षा में प्रवेश मिल जायेगा, लेकिन उसके प्रवेश को अन्तिम समझा जायेगा और यदि वह उस परीक्षा को पास करने का प्रमाण यथासम्भव शीघ्र और किसी भी हालत में इस परीक्षा के प्रारम्भ होने

से दो महीने के भीतर पेश नहीं करता, तो उसके प्रवेश को रद्द कर दिया जायेगा।

नोट 3 :—आपवादिक मामलों में, आयोग किसी ऐसे उम्मीदवार को शैक्षणिक दृष्टि से अर्ह मान सकता है जिसके पास इस नियम में निर्धारित अर्हताओं में से कोई भी अर्हता न हो लेकिन जिसके पास ऐसी अर्हता हो, जिनके स्तर के बारे में आयोग का यह मत हो कि उनके आधार पर उसे परीक्षा में प्रवेश देना उचित है।

7. उम्मीदवार के लिए आवश्यक होगा कि वह आयोग की सूचना के अनुबन्ध 1 में विनिर्दिष्ट फीस दे।

8. सरकारी सेवा में स्थायी या अस्थायी हैसियत से काम करने वाले उम्मीदवार के लिए आवश्यक होगा कि वह परीक्षा में बैठने के लिए अपने विभागाध्यक्ष से पूर्वानुमति प्राप्त करे।

9. परीक्षा में प्रवेश के लिए कोई उम्मीदवार पात्र है या नहीं, इस सम्बन्ध में आयोग का निर्णय अन्तिम होगा।

10. जब तक किसी उम्मीदवार के पास आयोग से प्राप्त प्रवेश प्रमाणपत्र नहीं होगा तब तक उसे परीक्षा में नहीं बैठने दिया जायेगा।

11. अपनी उम्मीदवारी के लिए किसी उम्मीदवार द्वारा किसी भी साधन से किया गया कोई प्रयास उसे प्रवेश के लिए अनर्ह बना सकता है।

12. यदि आयोग द्वारा कोई उम्मीदवार प्रतिरूपण करने, या जाली दस्तावेज पेश करने या दस्तावेजों में काट छांट करने, या गलत या झूठे बयान देने, या महत्वपूर्ण सूचना दबा लेने या परीक्षा में प्रवेश पाने के लिए अन्य अनियमित अथवा अनुचित साधनों का सहारा लेने, या परीक्षा भवन में गैरहित साधनों का प्रयोग करने या उनके प्रयोग की चेष्टा करने या परीक्षा भवन में दुर्व्यवहार करने का दोषी हो या आयोग द्वारा दोषी घोषित किया गया हो तो उस पर आपराधिक अभियोग के चलाये जाने के अतिरिक्त निम्नलिखित सजा भी दी जा सकती है :—

(क) उसे स्थायी रूप से या विशिष्ट अवधि के लिए :—

(i) आयोग द्वारा उम्मीदवारों का चयन करने के लिए आयोग की परीक्षा में प्रवेश या साक्षात्कार में उपस्थित होने से

(ii) केन्द्रीय सरकार द्वारा अपने अधीन नियोजन से, वादित किया जा सकता है।

(ख) यदि वह पहले से ही सरकारी सेवा में हो, तो उपयुक्त नियमों के अन्तर्गत उसके विरुद्ध अनुशासन की कार्रवाई की जा सकती है।

उक्त परिशिष्ट में उल्लिखित सीमा के सिवाय फीस की वापसी के किसी बाब को न तो स्वीकार किया जायेगा और न ही फीस को किसी परीक्षा या चयन के लिए आरक्षित रखा जायेगा।

13. जो उम्मीदवार लिखित परीक्षा में, उतने न्यूनतम अर्हक अंक प्राप्त कर लेते हैं, जितने आयोग स्वविवेक से निर्धारित करे, उन्हें आयोग व्यक्तिगत परीक्षा हेतु साक्षात्कार के लिए बुलाएगा।

14. परीक्षा के बाव आयोग हर उम्मीदवार को अन्तिम रूप से दिये गये कुल अंकों के अनुसार योग्यता के आधार पर

उम्मीदवारों की एक सूची बनायेगा और उसी क्रम से उन उम्मीदवारों की, जिन्हें आयोग परीक्षा में अर्ह समझे उतनी अनारक्षित रिक्तियों पर नियुक्ति के लिए सिफारिश की जायेगी जितनी परीक्षा के परिणाम के आधार पर भरने का निर्णय किया गया हो।

परन्तु अनुसूचित जाति या अनुसूचित आदिम जाति का कोई उम्मीदवार, जो यद्यपि आयोग द्वारा निर्धारित स्तर के सेवा के लिए अर्ह न हो, प्रसाशन के कार्य कुशलता का यथोचित ध्यान रखते हुये, उसके द्वारा नियुक्ति के लिये उपयुक्त घोषित किया गया हो, तो उस सेवा में, अनुसूचित जातियों और अनुसूचित आदिम जातियों के सदस्यों के लिए आरक्षित रिक्तियों, जैसी भी स्थिति हो, पर नियुक्ति के लिए सिफारिश की जायेगी।

15. प्रत्येक उम्मीदवार को परीक्षाफल किस रूप में और किस ढंग से भेजा जाये, इस बात का निर्णय आयोग स्वविवेक से करेगा और परिणाम के सम्बन्ध में आयोग उम्मीदवारों से कोई पत्र-व्यवहार नहीं करेगा।

16. परीक्षा में सफल होने से तब तक नियुक्ति का अधिकार नहीं मिल जाता जब तक सरकार आवश्यक जांच-पड़ताल के बाद इस बात से सन्तुष्ट न हो जाये कि उम्मीदवार सरकारी सेवा में नियुक्ति के लिए सर्वथा उपयुक्त है।

17. उम्मीदवार के लिए आवश्यक है कि मानसिक और शारीरिक दृष्टि से पूर्णतया स्वस्थ हो और उसमें कोई ऐसा शारीरिक दोष न हो जिसके कारण सेवा में अधिकारी के नाते उसके कर्तव्य पालन में बाधा पड़ने की सम्भावना हो। जो उम्मीदवार (ऐसी शारीरिक परीक्षा के बाद जैसी कि सरकार या नियुक्ति करने वाला प्राधिकारी, जैसी स्थिति हो, विनिर्दिष्ट करें) इन आवश्यक बातों को पूरा नहीं करता, उसे नियुक्त नहीं किया जायेगा केवल उन्हीं उम्मीदवारों की डाक्टरी परीक्षा ली जायेगी, जिनकी नियुक्ति के बारे में विचार होने की सम्भावना रहती है। डाक्टरी परीक्षा के समय उम्मीदवारों को सम्बन्धित चिकित्सा मण्डल को 16 रुपये फीस देनी होगी।

नोट :-उम्मीदवारों को किसी प्रकार की निराशा न हो, उसके लिए उन्हें सलाह दी जाती है कि परीक्षा में प्रवेश के लिए आवेदन करने से पहले सिविल सर्जन के स्तर के किसी चिकित्सा अधिकारी से अपनी परीक्षा करा लें। नियुक्ति से पहले उम्मीदवारों की किस प्रकार की डाक्टरी परीक्षा होगी और उसमें उनसे किस स्तर की अपेक्षा की जायेगी, इसका ब्योरा इन नियमों के परिशिष्ट II में दिया गया है। अपाहिज भूतपूर्व सैनिक कर्मचारियों के सम्बन्ध में, प्रत्येक सेवा की आवश्यकताओं को ध्यान में रखते हुए, इन स्तरों में छूट दी जायेगी।

18. कोई भी व्यक्ति

(क) जिसने ऐसे व्यक्ति से विवाह किया हो अथवा विवाह करने का संविदा किया हो, जिसकी एक पत्नी/जिसका एक पति जीवित हो अथवा

(ख) जिसने एक पत्नी/पति के रहते हुए किसी व्यक्ति से विवाह किया हो अथवा विवाह करने का संविदा किया हो,

सेवा में नियुक्ति के लिए पात्र नहीं होगा।

परन्तु यदि केन्द्रीय सरकार इस बात से सन्तुष्ट हो कि ऐसे व्यक्ति तथा विवाह के दूसरे पक्ष पर लागू होने वाली स्वीय विधि के अन्तर्गत इस प्रकार का विवाह अनुमेय है, और ऐसा करने के अन्य कारण हैं, तो वह किसी व्यक्ति को इस नियम के प्रवर्तन से छूट दे सकती है।

19. इस परीक्षा के माध्यम से चयन किये गये विशेष श्रेणी अप्रेंटिसों के लिए अप्रेंटिसी की शर्तें परिशिष्ट III में दी गयी हैं। यांत्रिक इंजीनियरों की भारतीय रेल सेवा से सम्बन्धित संक्षिप्त विवरण भी परिशिष्ट (iv) में दिये गये हैं।

सी० एस० परमेश्वरन, सचिव, रेलवे बोर्ड

खाद्य, कृषि, सामुदायिक विकास और सहकारिता मंत्रालय (कृषि विभाग)

नई दिल्ली-1, दिनांक 29 अगस्त 1970

संकल्प

सं० 25-13/68-सामान्य समन्वय—भारतीय अर्थ व्यवस्था में कृषि का प्रमुख स्थान है। राष्ट्रीय आय का लगभग आधा भाग इस पर आधारित है, लगभग 70 प्रतिशत कर्मशील जनसंख्या को इससे काम मिलता है और देश के विदेशी-मुद्रा-अर्जन में इसका बड़ा योगदान है।

2. जनसंख्या तेजी से बढ़ रही है, जिसके फलस्वरूप खाद्य पदार्थों और अधिकांशतः कृषि पर आधारित अन्य उपभोक्ता-वस्तुओं की मांग बढ़ रही है। ग्रामवासियों में अपना जीवन-स्तर सुधारने और विकास के लाभों में हिस्सा लेने की आकांक्षा मान्य है।

3. कृषि में तेजी से विकास तभी हो सकता है जब कि नये-नये अनुसंधानों और टेक्नोलौजी में प्रगति की जाये, उत्पादक सामग्रियों का अधिक से अधिक उपयोग किया जाये, सिंचाई और अन्य उन्नत पद्धतियों से काम लेकर मौसम पर निर्भरता को कम किया जाये। हाल की प्रवृत्तियों से भारतीय कृषि में बढ़ोत्तरी की बड़ी सम्भावनाएँ दिखाई देती हैं। सघन कृषि विकास कार्यक्रम (पैकेज कार्यक्रम), सघन कृषि क्षेत्र कार्यक्रम और नई कृषि नीति को लागू करने से जो अनुभव हुए हैं, उनसे पता चलता है कि किसान लोग वैज्ञानिक और उन्नत कृषि पद्धतियों से काम लेने के इच्छुक हैं और अन्य इत्यादि के प्रोत्साहक मूल्यों की अपेक्षा करते हैं। एक दो फसलों में काफी प्रगति हुई है और आशा है कि दूसरे धान्यों और कुछ खाद्य-तर फसलों में इसी प्रकार की प्रगति हो सकेगी। यह स्पष्ट है कि मौसम पर निर्भरता को कम करने के विचार से, गैर-सरकारी और संस्थात्मक दोनों साधनों से सिंचाई और अन्य सुविधाओं में पैसा लगाया जा रहा है। टेक्नोलौजी तथा गैर-फार्म उपादानों का इस्तेमाल भी तेजी से बढ़ रहा है। परिवहन और अन्य सुविधायें मिल जाने के कारण, देहात का बाजार से सम्पर्क बढ़ रहा है और फार्म उपज की निकासी का रास्ता खुल रहा है।

4. इस प्रकार के विकास के दौरान यह नितान्त आवश्यक है कि ऐसी व्यवस्था की जाये कि नयी तकनीकी के लाभ अधिकांश किसानों को मिल सकें, और ये लाभ सम्पन्न किसानों तक सीमित न रहें। यह तो ठीक है कि सिंचित क्षेत्रों में अनेक फसलें लेकर और अधिक आदान लगाकर, सघन विकास हो सकता है, परन्तु वर्षा

पर निर्भर ऐसे भी बड़े क्षेत्र हैं जहाँ इन क्षेत्रों के मुताबिक किसानों को तकनीकी का विकास करने और इन को आवश्यक साधन देने की जरूरत है। इसके अलावा, इस समय जहाँ एक ओर खाद्यान्नों का उत्पादन बहुत बढ़ रहा है वहाँ दूसरी तरफ़ बिकनाई और प्रोटीन में चिंताजनक कमी हो रही है। इसलिए यह जरूरी है कि खेतों में विविध फसलें पैदा की जायें और नई तकनीकी का उपयोग बागवानी फसलों के लिए भी किया जाये। कुल मिलाकर उद्देश्य यह होना चाहिये कि संतुलित आहार और विकास के लिए कृषि, पशु-पालन, मुर्गी-पालन, अंतर्देशीय मत्स्य-पालन और बनों का सुसम्बद्ध विकास किया जाए।

5. विभिन्न दिशाओं में प्रगति की संभावनाओं के फलस्वरूप यह लाजिमी हो गया है कि विकास के सभी पक्षों के प्रति समन्वित और प्रगतिशील दृष्टिकोण अपनाया जाए। बेकारी की समस्याओं को हल करने और निम्न तथा उच्च आय वाले किसानों और सिंचित तथा वर्षा पर निर्भर क्षेत्रों के मध्य असमानता को कम करने जैसे विषयों में तत्काल काम उठाने की आवश्यकता है। विकास की गति को बनाये रखने के लिए अनुसन्धान और विस्तार नितांत आवश्यक है। इन के मौजूदा प्रबन्धों की छानबीन होनी चाहिये। इससे नई तकनीकी से काम लेने में जो समस्याएं आती हैं उनका सामना किया जा सकेगा और किसानों और वैज्ञानिकों में परस्पर सम्पर्क बढ़ेगा।

6. कुल मिलाकर, यह देखना पड़ेगा कि कृषि-विकास वेहातों में रहने वाले असंख्य लोगों के लिए अधिकाधिक लाभकारी हो।

7. इसी पृष्ठभूमि में भारत सरकार ने एक राष्ट्रीय आयोग स्थापित करने का निर्णय किया है जो भारतीय कृषि की प्रगति, समस्याओं और सम्भाव्यताओं का अन्वेषण करेगा। स्तर के विचार से और इसे सौंपे गये कार्यों की दृष्टि से, इस आयोग का स्तर सर्वोच्च होगा और सरकार को विश्वास है कि इसके प्रतिवेदन और सिफारिशों का भारतीय कृषि में सभी अंगों के उत्तरोत्तर विकास पर दूरगामी और ऐतिहासिक प्रभाव पड़ेगा।

8. ऊपर के पैराग्राफों में बताई गई कृषि स्थिति के संदर्भ में, आयोग के विचारार्थ विषय निम्नलिखित होंगे :—

- (1) जनता की भलाई और खुशहाली को ध्यान में रखते हुए, भारत में कृषि की वर्तमान प्रगति का व्यापक अध्ययन करना; और उसमें सुधार करने और उसे आधुनिक बनाने के लिए सिफारिशें करना;
- (2) विशेषकर, कृषि के निम्नलिखित पक्षों का अन्वेषण करना और उन पर रिपोर्ट देना :—
- (क) फसल उत्पादन और भूमि तथा जल विकास

- (1) भूमि तथा जल के प्रयोग के आर्थिक पक्ष और उसकी पद्धतियाँ, और संतुलित पौष्टिक आहार, औद्योगिक उपयोग तथा निर्यात के लिये फसलों के विस्तार की संभावना, विशेषकर बागवानी के विकास की आवश्यकता और संभावना;

- (2) मृदा तथा आर्द्रता संरक्षण की समस्याएं, विशेषतः वे समस्याएं जिनका सम्बन्ध एक ओर बड़ी सिंचाई परियोजनाओं के कैचमेंट क्षेत्र से है और दूसरी ओर मृदा संरक्षण उपायों और उन्नत कृषि पद्धतियों के संयुक्त रूप से अपनाने से है।

- (3) अन्य, बड़ी तथा छोटी सतही सिंचाई परियोजनाओं को ध्यान में रखकर जल प्रबन्ध तथा भूमिगत जल के उपयोग से सम्बन्धित समस्याएं;

- (4) लवण वाली भूमि के क्षेत्रों की आवश्यकताओं को विशेषतः ध्यान में रखते हुए, भूमि को उपयोगी बनाने और उसके विकास के कार्यक्रम;

- (5) आवातों की यथोचित सप्लाई और उत्पादन की जरूरतों के रूप में, विशेषकर सप्लाई के स्रोतों और समस्याओं को ध्यान में रखते हुए, वैज्ञानिक कृषि की नयी नीति की आवश्यकताएं और विशेषकर :—

- (क) अधिक उत्पादनशील किस्मों के बीजों और अन्य उन्नत बीजों का संवर्धन और वितरण;

- (ख) रासायनिक उर्वरक तथा अन्य कार्बनिक खादों सहित, मृदा पोषकों का प्रचार-प्रसार;

- (ग) खराब होने के जोखिम को ध्यान में रखते हुए, पौध रक्षण उपाय; और

- (घ) सरकारी, सहकारी तथा अन्य सांस्थानिक अभिकरणों से कृषि ऋण;

- (6) उन्नत तकनीकी से काम लेने के संदर्भ में, जिसमें अधिक उत्पादनशील किस्मों का प्रयोग और बहुफसल पद्धति अपनाई जाती है, ग्रामीण रोजगार की स्थिति पर प्रतिकूल प्रभाव डाले बिना, कृषि यन्त्रीकरण के लिए गुंजाइश और अल्पकालीन तथा दीर्घकालीन सम्भाव्यताएं।

ख. पशु उत्पादन, मत्स्य उद्योग तथा वन उद्योग :

- (1) पशु-पालन का विकास, जिससे लोगों को पोषक आहार, कृषि कार्यों के लिए कर्षण-शक्ति और ग्रामीणों के लिए आय और रोजगार के अवसर प्रदान किये जा सकें;
- (2) मुर्गी-पालन, मुअर-पालन, भेड़ तथा बकरी-पालन का विकास, जिससे सन्तुलित आहार में योगदान के अलावा, ग्रामीण क्षेत्रों में आय और रोजगार के अवसर बढ़ाए जा सकें;
- (3) पशुओं में रोग-नियंत्रण के लिए आवश्यक उपाय, जिससे उनकी कार्यक्षमता में वृद्धि हो सके;
- (4) समुद्री, अन्तर्देशीय तथा समुद्रसंगमी मात्स्यकी का विकास, जिससे सन्तुलित आहार और निर्यात-अर्जन में वृद्धि के अलावा, इस व्यवसाय पर निर्भर रहने

वाने निर्धन वर्ग के लोगों के लिये आय और रोजगार के अवसरों में वृद्धि हो सके;

- (5) वनों का विकास, जिसमें रोपित वन भी शामिल हैं, जो कृषि प्रगति के लिये घटक का, उद्योग के लिए कच्चे माल और निर्यात के लिये स्रोत का तथा प्रकृति में परिस्थिति को संतुलन बनाये रखने का काम देगा और इन क्षेत्रों में रहने वाली जन-जातियों तथा अन्य लोगों की बड़ी संख्या के लिये रोजगार के अवसर प्रदान करेगा।

ग. अनुसंधान, शिक्षा तथा प्रशिक्षण :

- (1) कृषि अनुसंधान के विकास की उपलब्धियां, खामियां तथा संभावनाएं तेजी से विकासशील तकनीकी के संदर्भ में कृषि अनुसंधान को, और खेतों में उसके प्रयोग को बढ़ावा देने के लिए जरूरी उपाय; और किसानों के खेतों पर वैज्ञानिक प्रदर्शनों की, विस्तार व्यवस्था को तेज करने की और किसानों तथा वैज्ञानिकों में परस्पर संपर्क स्थापित करने की आवश्यकता;
- (2) कार्मिकों की शिक्षा तथा प्रशिक्षण—(क) विश्वविद्यालयों तथा उच्च कृषि शिक्षा स्तर पर, (ख) कृषि में सम्बद्ध व्यवसायों में लगे हुए कार्मिकों का माध्यमिक स्तर पर प्रशिक्षण, और (ग) कृषि विकास में सम्बन्धित सरकारी तथा अन्य कार्मिकों का प्रशिक्षण;
- (3) कृषक के प्रशिक्षण एवं शिक्षा का महत्व तथा मानव साधनों को संगठित करने की पद्धतियां और कृषि विकास कार्यक्रमों में लोगों की दिलचस्पी बढ़ाना।

घ. संगठन तथा सहायक उपाय :

- (1) कृषि अनुसंधान तथा विकास कार्यक्रमों को कार्यान्वित करने में लगे हुए सरकारी तथा गैर-सरकारी वर्तमान अभिकरणों तथा कार्मिकों के स्वरूप तथा गठन की जांच और नीतियों के निर्धारण, कार्यक्रमों के बनाने और खेतों में इनके कार्यान्वयन के लिये बदली हुई जरूरतों के अनुसार अपेक्षित सुधार तथा समायोजन; और केन्द्रीय तथा राज्य सरकारों का सापेक्ष योगदान तथा उत्तरदायित्व;
- (2) बागबानी और पशुपालन समेत कृषि उत्पादन में वृद्धि के कार्यक्रमों के लिए खाद्य संसाधन को सहायक बनाने के विशेष संदर्भ में, परिवहन, विपणन तथा भण्डारण और संसाधन उद्योगों का विकास।

ड. रोजगार तथा मानव-शक्ति :

- (1) कृषि क्षेत्र में रोजगार की सम्भाव्यताएं और कृषि नीतियों तथा कार्यक्रमों को बनाने में रोजगार के लक्ष्य को प्राप्ति की कठिनाइयां;
- (2) ग्रामी क्षेत्रों में रोजगार के अवसर पैदा करने के लिए जो योजनाएं जरूरी हैं, उनके स्वरूप के प्रदर्शन के लिये मार्गदर्शी परियोजनाओं की गुंजाइश;
- (3) कृषि कार्यक्रमों के लिये मानव शक्ति की आवश्यकता और भर्ती तथा प्रशिक्षण की पद्धतियां;

- (4) सामाजिक न्याय और समान अवसर प्रदान करने के संदर्भ में और यह सुनिश्चित करने के लिये कि कृषि उत्पादन को बढ़ाने में अधिक से अधिक भारतीय किसान सक्रिय भाग लें, छोटे किसानों और कृषि श्रमिकों की समस्याएं।

च. अन्य पहलू :

- (1) एकीकृत क्षेत्रीय विकास के लिये अपेक्षित धारणा, सम्भाव्यता और उपाय, जो विशेषतः शुष्क तथा वर्षा पर निर्भर क्षेत्रों, सिंचाई परियोजनाओं के कमाण्ड क्षेत्रों और दूरस्थ, आर्थिक रूप से पिछड़े, पर्वतीय तथा जन-जातियों के क्षेत्रों से सम्बन्धित हों;
- (2) भूमि-सुधार, चकबन्दी और भूमि-सुधार तथा कृषि उत्पादन में परस्पर सम्बन्ध;
- (3) कृषि उत्पादन के लिये प्रोत्साहन की नीति के रूप में कृषि मूल्यों से सम्बन्धित समस्याओं का अध्ययन;
- (4) फसल बीमा;
- (5) कृषि नीतियों तथा कार्यक्रमों को बनाने और उनको कार्यान्वित करने के लिए विश्वसनीय और समय पर कृषि आंकड़ों की प्राप्ति।

9. इस आयोग में एक अध्यक्ष, एक सदस्य-सचिव, पांच पूर्ण-कालिक सदस्य और 10 अंशकालिक सदस्य होंगे। भूतपूर्व खाद्य और कृषि मन्त्री श्री सी० सुब्रह्मण्यम को राष्ट्रीय आयोग के अध्यक्ष के रूप में नियुक्त करने का निश्चय किया गया है। श्री जे० एस० शर्मा, अर्थ एवं सांख्यिकी सलाहकार और कृषि गणना आयुक्त, खाद्य और कृषि मन्त्रालय, भारत सरकार, इसके पूर्णकालिक सदस्य-सचिव नियुक्त किये गए हैं। अन्य नामों की घोषणा बाद में की जाएगी।

10. आयोग अपनी सिफारिश यथा सम्भव शीघ्र और हर हालत में दो वर्ष की अवधि के अन्दर दे देगा। आयोग, विशेषतः विचारार्थ विषयों की मद संख्या ग(1), घ(1), ङ(1), ञ(4) और च(1) और अन्य किसी ऐसे विषय में, जिसे यह उचित समझे, अवधि के पहले सिफारिशें देगा।

11. खास विषयों या समस्याओं का गहराई से अध्ययन करने के लिए आयोग को अध्ययन-दल या उप-समितियां स्थापित करने का पूरा अधिकार रहेगा। आयोग में पूर्ण-कालिक तथा अंश-कालिक तकनीकी परामर्शदाता भी लिये जा सकेंगे। ऐसे किसी भी पहलू पर, जो आयोग के विचारार्थ विषयों में आता हो और जो इसके कार्य से सम्बद्ध हो, यदि कोई अन्य विशेषज्ञ निकाय या आयोग विचार कर रहा हो, तो आयोग के लिए ऐसे विशेषज्ञ निकायों और आयोगों से परामर्श की व्यवस्था की जाएगी।

12. आयोग का प्रधान कार्यालय नई दिल्ली में होगा।

13. आयोग अपनी कार्य-प्रणाली स्वयं निश्चित करेगा। वह ऐसी सूचना और साक्ष्य प्राप्त कर सकता है, जिसे वह आवश्यक समझे। भारत सरकार के मन्त्रालय विभाग ऐसी जानकारी और दस्तावेज तथा ऐसी सहायता प्रदान करेंगे, जो आयोग उनसे मांगे।

14. भारत सरकार का विश्वास है कि राज्य सरकारें/संघ क्षेत्र प्रशासन, आयोग को अपना पूरा सहयोग और सहायता प्रदान करेंगे।

आदेश

आदेश दिया जाता है कि संकल्प की एक-एक प्रति, अध्यक्ष तथा सदस्य सचिव, भारत सरकार के समस्त मन्त्रालयों/विभागों, प्रधान मन्त्री सचिवालय, राष्ट्रपति सचिवालय, योजना आयोग, मंत्रिमण्डल सचिवालय, भारत के नियंत्रक तथा महालेखा परीक्षक, समस्त राज्यों और संघ क्षेत्रों के सचिवों, कृषि विभागों, खाद्य, कृषि, सामुदायिक विकास और सहकारिता मन्त्रालय (कृषि विभाग) के समस्त संलग्न तथा अधीनस्थ कार्यालयों, लोक-सभा सचिवालय, राज्य-सभा सचिवालय तथा संसदीय पुस्तकालय (5 प्रतियाँ) को भेजी जाए।

यह भी आदेश दिया जाता है कि सर्वसाधारण की जानकारी के लिए इस संकल्प को भारत के राजपत्र में प्रकाशित किया जाए।

दिनांक 26 सितम्बर 1970

सं० 6-30/70—सामान्य समन्वय—भारत सरकार के खाद्य, कृषि, सामुदायिक विकास और सहकारिता मन्त्रालय (कृषि विभाग) के संकल्प सं० 25-13/68—सामान्य समन्वय दिनांक 29-8-1970 (जिसमें राष्ट्रीय कृषि आयोग की स्थापना का निश्चय सूचित किया था) के अनुसरण में यह निर्णय किया गया है कि अध्यक्ष और सदस्य-सचिव (जिनके नामों की पहले ही घोषणा कर दी गई है) के अतिरिक्त, राष्ट्रीय कृषि आयोग में निम्नलिखित सदस्य होंगे :

(1) पूर्णकालिक सदस्य :—

1. श्री एस० के० मुखर्जी, उप-कुलपति, कल्याणी विश्व-विद्यालय।

2. डा० एच० आर० आरकेरी, कृषि निदेशक, मैसूर।
3. डा० पी० भट्टाचार्य, सेवानिवृत्त पशु-पालन आयुक्त।

(2) अंशकालिक सदस्य :—

1. श्री एम० बी० कृष्णाप्पा, सदस्य लोक सभा।
2. श्री रणधीर सिंह, सदस्य लोक सभा।
3. डा० जै० ए० अहमद, सदस्य राज्य सभा।
4. सरदार जोगेन्द्र सिंह, सदस्य राज्य सभा।
5. डा० एम० एस० स्वामीनाथन, निदेशक, भारतीय कृषि अनुसंधान संस्थान, नई दिल्ली।
6. डा० डी० पी० सिंह, उप-कुलपति, कृषि विश्वविद्यालय, पन्तनगर।
7. श्री टी० ए० पाई, अध्यक्ष, भारतीय जीवन बीमा निगम।
8. श्री बी० एम० नाग, भूतपूर्व सलाहकार (सिंचाई तथा विद्युत), योजना आयोग, नई दिल्ली।
9. डा० ए० एम० खुसरो, प्रोफेसर अर्थशास्त्र, इन्स्टिट्यूट आफ इकनामिक ग्रोथ, दिल्ली।
10. श्री हरि सिंह, सेवानिवृत्त वनों के महा-निरीक्षक।
11. श्री एन० के० पाणिकर, निदेशक, राष्ट्रीय समुद्र-विज्ञान संस्थान।

2. बाकी पूर्णकालिक सदस्यों के नाम बाद में घोषित किये जायेंगे।

त्रिभुवन प्रसाद सिंह, सचिव

PRESIDENT'S SECRETARIAT

New Delhi, the 15th October 1970

No. 50-Pres./70.—The President is pleased to approve the award of UTTAM JEEVAN RAKSHA PADAK to the undermentioned persons for courage and promptitude under circumstances of great danger to their own lives :—

1. Shri Gopeshwar Shekar,
Village and Post Office: Amlabad,
Police Station: Chandankiari,
District: Dhanbad, Bihar.

On 1st August 1969, owing to faulty electrical circuit, an underground fire had broken out in the Amlabad Colliery of Messrs Bhowra Kankane Collieries Ltd. The fire started 800 feet below the surface and about 250 persons were in the underground. Very close to the scene of the fire, inflammable gas was coming out. There was every chance of the gas catching fire and blowing up the mine. At this juncture Shri Gopeshwar Shekar, a mining sirdar, without losing any time and his nerves, risked his own life to reach the source of the inflammable gas and prevented the ignition of the gas by short circuiting the ventilation current. He also cautioned all the workers to get out of the mine. After making sure that there were no persons likely to be affected by the noxious gas and fumes, with the help of some other workers and senior supervisory staff, he extinguished the fire.

Shri Gopeshwar Shekar showed exemplary courage and presence of mind in detecting and controlling the accidental fire and avoided a disaster.

2. Shri Ram Peary Harijan,
Gateman, Liluah,
Eastern Railway.

(Posthumous)

On 25th October 1969, at about 1810 hours, when C-251 Up Howrah-Burdwan Chord Local train was fast approaching Liluah station, Shri Ram Peary Harijan, Gateman on

duty at Level Crossing Gate No. 1A, noticed an old lady and a child crossing the railway lines unmindful of an advancing electrical train. Realising that they were about to be run over, Shri Ram Peary rushed forward, regardless of his personal safety and pushed the lady and the child off the track. As the speeding electric train was too close, he himself could not get out of the track and was knocked down by the train and killed. The exemplary courage and inspiring heroism shown by Shri Ram Peary in saving the lives of two human beings, sacrificing his own life in that process, would remain a source of inspiration to others.

3. Shri Nozer Pherooshaw Kolah,
Flotilla Engineer, Bombay Port Trust,
Bombay.

(Posthumous)

On 11th August 1969, while Bombay Port Trust's tug 'Arjun' was at Butcher Island, Shri Nozer Pherooshaw Kolah detected a leakage in the port boiler of the tug. The tug was immediately brought to Princes Dock, Bombay. While it was being tied to the wharf for effecting repairs, a violent explosion occurred in the engine room. In a matter of moments the contents of the boiler escaped and filled the entire stockhold of the engine room. Shri Kolah and some others were badly scalded and burnt. The injury to Shri Kolah was so severe that the entire skin appeared to be hanging loose from the rest of the body. Although in great agony, with the help of the engineer of another tug which was tied nearby, he tried to rescue a fireman still trapped in the stockhold. Shri Kolah asked him to pull a rope tied on the easing gear wire rope in the stockhold close to the entrance of the main dock so as to ease the safety valve and thus reduced the boiler pressure. The plan did not succeed. The other engineer got a blast on his face and the rope also snapped. In spite of this, Shri Kolah continued his effort to rescue the trapped fireman. Shri Kolah later succumbed to the injuries.

Shri Nozer Pherooshaw Kolah had acted in total disregard of his personal safety. His irresistible desire to save the

life of a worker when he himself was in great agony is highly praise-worthy.

4. Shri Mullakkara Ramankutty Nair,
Mullakkara House,
Village: Amballoor, P.O. Alagappa Nagar,
District: Trichur, Kerala. (Posthumous)

On 8th January 1970 at about 6.45 p.m., Shri Mullakkara Ramankutty Nair and the members of his family heard a noise from a nearby well. They immediately ran to the spot and found their neighbour Shrimati Rosy struggling for life in the deep waters. Shri Nair wanted to jump into the well immediately to save her but his wife asked him to hold on for a while and ran to bring a rope for him to get into the well. But seeing the woman struggling for life, Shri Nair did not wait for the rope and without wasting time, jumped into the well. In the meanwhile the neighbours rushed to the scene and saved the life of Shrimati Rosy. But Shri Mullakkara Ramankutty Nair lost his life.

Shri Mullakkara Ramankutty Nair sacrificed his own life in his attempt to save the life of another individual from drowning.

5. Master Kochuthazhathu Varkey George,
Kochuthazhathu Veedu, P.O. Mutholapuram,
Village: Elanji, Muvattupuzha Taluk,
District: Ernakulam, Kerala. (Posthumous)

On 7th July 1969, Master K. V. George aged 13 years, a student of St. Peter's High School, Elanji was in his compound with his younger brother when he was his young friend and neighbour Shri K. K. Sivendran who had slipped into a nearby pond and was struggling for life. Master George left his brother and jumped into the pond to save his drowning friend. But Shri Sivendran caught him round and both the boys sank into the pond and died. Master K. V. George showed exemplary courage in attempting to save his friend and neighbour.

No. 51-Pres./70.—The President is pleased to approve the award of JEEVAN RAKSHA PADAK to the undermentioned persons for courage and promptitude in saving life at the risk of grave bodily injury to themselves :—

1. Shri Raman Surya Rao,
Village Manturu, Rampachodavaram Taluk,
District East Godavari,
Andhra Pradesh.

On 29th July 1969, launch "Jhansi Rani" was caught in a whirlpool off Manturu village in river Godavari and capsized. The river was in spate and 26 passengers were drowned. 9 crew members and 12 passengers managed to reach the bank. A few persons caught in the whirlpool were also struggling hard to reach the bank. Shri Raman Surya Rao, a humble labourer, who happened to be at the bank at the time of the tragedy, saw a man caught in the whirlpool struggling in vain to come out. Shri Rao caught hold of a log of wood which was drafting in the waters swam into the whirlpool, got the man (Shri Sorra Ramakrishna) to clutch on to his legs, pulled him out of the dangerous whirlpool, and safely brought him to the bank. He showed exemplary courage and great presence of mind in saving Shri Ramakrishna from drowning.

2. Shri Manneypalli Srinivasa Rao,
Clerk, Head Post Office,
Nellore, Andhra Pradesh.

On 17th October 1969, at about 11.45 a.m. Shri Manneypalli Srinivasa Rao, while crossing the causeway across the river Chilla Kalva which was in floods, noticed a seven year old boy being washed away by the flood waters. Instantly he dived into the river without caring even to remove his clothes and with great presence of mind managed to bring the boy to safety. But for Shri Rao's presence and his courageous act, the boy would have been drowned. In saving the life of a small helpless boy from the dangerous flood waters Shri Manneypalli Srinivasa Rao displayed conspicuous courage and promptitude unmindful of the great danger to his own life from the gushing flood waters.

3. Shri Dattatraya Jagannath Rakshe,
411, Somwar Peth,
Satara City,
Maharashtra.

Shri Atmaram Bhujbal, a lineman from the Posts and Telegraphs Department, received an electric shock on 19th April,

1969 at about 14.00 hours while carrying out repairs to the telephone lines on the top of a telephonic pole and became unconscious. He was hanging on the wires with his head towards the ground in the busy street of Satara city but no one from the crowd that had assembled there dared to step forward for rescuing the lineman. Shri Dattatraya Jagannath Rakshe of Public Health Department was driving on the road in a jeep at that time. Noticing the incident, he immediately got down from his jeep and after climbing up the pole, rescued Shri Atmaram Bhujbal with great courage and skill. Shri Rakshe thereafter took him to Government Hospital for treatment. But for the conspicuous courage and promptitude displayed by Shri Dattatraya Jagannath Rakshe at the risk of his own life Shri Bhujbal would have probably died.

4. Shri Ambalavanan Jayaseelan,
C/o Shri Ramachandran Pillai,
28, Keelakandi Street, Beemanagar,
Tiruchirappalli,
Tamil Nadu.
5. Shri Tamil Mani,
Sundarakottai, Mannargudi Taluk,
District Thanjavur,
Tamil Nadu.

On 13th December 1967, Shrimati Vijayalakshmi who was bathing in the Pamini river at Mannargudi lost her hold and was swept away by the swift current of the river. On seeing this, two students Sarvashri Ambalavanan Jayaseelan and Tamil Mani jumped into the river without regard to their personal safety and rescued the woman from being drowned. This selfless act on the part of the two students is highly commendable.

6. Shri Lal Chand Hira Lal Dhobi,
45th Battalion, Central Reserve Police,
Directorate General of Security,
Cabinet Secretariat.

During the unprecedented floods that wrought havoc in the hills and plains of Darjeeling, Jalpaiguri and Cooch-Behar of West Bengal in October, 1968, the house of Shri K. C. Sarkar in village Phaja, District Jalpaiguri, was flooded on 5th October, 1968, by the waters of river Teesta. Shri Sarkar, with little knowledge of swimming, tried to swim to a safe place but was caught in the swift current of the river. Shri Lal Chand Hira Lal Dhobi of 45th Battalion, Central Reserve Police noticed the plight of Shri Sarkar. Without caring for the safety of his own life, Shri Lal Chand Hira Lal plunged into the river. As he reached the drowning man, for some time it looked as though both would be drowned. However, after considerable effort, Shri Lal Chand Hira Lal managed to drag Shri Sarkar to the river bank. He displayed a high degree of selfless courage and deep concern for a fellow man. But for his timely and resolute action, Shri Sarkar could not have survived.

7. Shri Chinnapalli Gopal Singh,
Village and Post Office Doddachinapalli,
Bangarapet Taluk,
Mysore.

On 26th December, 1968 a cage containing 4 persons was stranded underground in vertical shaft at a depth of over 1600 metres below surface in the Nundydroog Gold Mine of Kolar Gold Mining Undertakings and 65 metres below the nearest accessible plat. The environmental conditions in the shaft were difficult and visibility was poor. Shri Chinnapalli Gopal Singh climbed down a rope ladder through a distance of 65 metres and after rescuing the persons climbed up the same. This was an act undertaken at great risk to the life of the rescuer as any wrong step would have dropped him down to the bottom of the shaft nearly 600 metres below.

8. Shri Sholinger Muniswamy,
No. 5, Henry's Masonary, 1 Block,
Post Office Coromandel,
Kolar Gold Field,
Mysore.

On 26th December, 1968 a cage containing 4 persons was stranded underground in a vertical shaft at a depth of over 1600 metres below surface in the Nundydroog Gold Mine of Kolar Gold Mining Undertakings and about 65 metres below the nearest accessible plat. The environmental conditions in the shaft were difficult and visibility was poor. Shri Sholinger Muniswamy volunteered himself to be lowered down with his shaft on a safety rope over a vertical distance

of 65 metres to find out the conditions of the shaft, cage, etc. which information was essential to decide upon the method of rescuing the men stranded in the cage. He undertook the work at great risk to his life as any wrong step would have dropped him down to the bottom of the shaft nearly 600 metres below.

9. Shri Doddur Jayaram,
Doddur Village, Post Office Bangarapet,
Mysore.

On 26th December, 1968 a cage containing 4 persons was stranded underground in a vertical shaft at a depth of over 1600 metres below surface in the Nundydroog Gold Mine of Kolar Gold Mining Undertakings and about 65 metres below the nearest accessible plat. The environmental conditions in the shaft were difficult and visibility was poor. Shri Doddur Jayaram volunteered himself to be lowered down this shaft on a safety rope over a vertical distance of 65 metres to lower the rope ladder and approach the cage containing the four men. This work was undertaken at great risk to the life of the rescuer as any wrong step would have dropped him down to the bottom of the shaft nearly 600 metres below.

10. Shri Raman Hari Chaudhari,
Overseer, Road Project Sub-Division,
No. 1, Agra Road, Dhulia,
Maharashtra.

In the evening of 28th May, 1966 a country craft carrying passengers across river Bhima near Daund, District Ahmednagar, capsized due to sudden winds of great velocity and all the passengers fell into deep water. Shri Raman Hari Chaudhari, who was standing on the other bank of the river after having a bath, heard the cries of the persons in distress. He jumped into the water immediately and brought 3 persons safely to the other bank of the river in two trips even though he received several injuries in this process. But for the conspicuous courage and promptitude displayed by Shri Raman Hari Chaudhari, even at the risk of his own life, the three persons would have probably died of drowning.

11. Shri Gopinath Das, Volunteer,
S.S.B., Directorate General of Security,
Cabinet Secretariat.
12. Shri Gosai Das Mallick, Volunteer,
S.S.B., Directorate General of Security,
Cabinet Secretariat.
13. Shri Radeshyam Sarkar, Volunteer,
S.S.B., Directorate General of Security,
Cabinet Secretariat.
14. Shri Atul Prosad Roy Chaudhury, Volunteer,
S.S.B., Directorate General of Security,
Cabinet Secretariat.
15. Shri Paresh Chandra Roy, Volunteer,
S.S.B., Directorate General of Security,
Cabinet Secretariat.
16. Shri Santosh Mirda, Volunteer,
S.S.B., Directorate General of Security,
Cabinet Secretariat.
17. Shri Nathuram Sarkar, Volunteer,
S.S.B., Directorate General of Security,
Cabinet Secretariat.

The toll of human lives during the unprecedented floods that caused terrible destruction of property, human lives and cattle in the hill and plain areas of Darjeeling, Jalpaiguri and Cooch-Bihar of West Bengal in October, 1968 would have been heavier but for the gallant voluntary rescue work by Sarvashri Gopinath Das, Gosai Das Mallick, Radeshyam Sarkar, Atul Prosad Roy Chaudhury, Paresh Chandra Roy, Santosh Mirda and Nathuram Sarkar, local S.S.B. workers. At grave risk to their own lives they succeeded in saving the lives of 88 persons (including women and children) who were floating down the river or were trapped in islands in the river in precarious conditions. With the help of an improvised raft, they worked continuously for four days and managed to bring the people over to a place of safety and save their lives. They also organised relief and assistance for those who survived this onslaught of nature.

Each one of them displayed exceptional courage, tireless energy and high sense of duty in carrying out the rescue work undertaken voluntarily.

18. 2/Lt. Parshotam Datt Sharma (SS-20314),
Artillery, 191 Mountain Regiment,
C/o 56 APO.

On 30th January, 1969, 2/Lt. Parshotam Datt Sharma was waiting to cross a narrow log bridge over the TENGA river in Kameng District, NEFA along with about 41 Other Ranks. The bridge consisted of two logs and at a time not more than one or two persons could walk over it. Suddenly two Other Ranks slipped and fell down into the deep river. The fact current started taking one of them towards the boulders. He was a non-swimmer and was carrying heavy web equipment and a rifle.

2/Lt. Sharma, with great courage and valour, jumped into the river and swam towards the drowning man. With tremendous effort and endurance, he brought the drowning Other Rank to safety. Without waiting to rest to regain his breath, 2/Lt. Sharma again went to the log bridge and with a super human effort pulled the other man to the bridge. By his courage and presence of mind, 2/Lt. Parshotam Datt Sharma succeeded in saving the lives of two drowning Other Ranks in utter disregard for his own personal safety.

19. Shri Ranjit Singh,
Sub-Inspector, Railway Protection Force,
Western Railway.
20. Shri Ramesh Chander Sharma,
Sub-Inspector, Railway Protection Force,
Western Railway.
21. Shri Chaitanya Deb Banerji,
Sub-Inspector, Railway Protection Force,
Eastern Railway,
Calcutta.

By the morning of 6th August, 1968 overnight rains had submerged Chiphwad and Jagannath temple in about 10 feet of water. The rain had caused great havoc to local population, their houses and cattle. About 158 persons including old men, women and children had taken refuge on the roofs of the highest buildings. To rescue them, three Railway Protection Force parties, each under the command of Sub-Inspectors Ranjit Singh, Ramesh Chander Sharma and Chaitanya Deb Banerji were deputed. As no boats were readily available, these parties had to improvise a raft with empty oil drums but the swollen floods and swift currents did not allow the raft to be taken to the desolate victims who faced imminent danger to their lives. Finding all other means to reach the victims impossible, they plunged into the turbulent flood waters in utter disregard of their personal safety and swam to the marooned persons with the ropes to which the raft was secured and succeeded in rescuing all the victims.

Sub-Inspectors Ranjit Singh, Ramesh Chander Sharma and Chaitanya Deb Banerji displayed conspicuous courage, selflessness and promptitude in saving the lives of 158 persons.

22. Shri B. N. Das,
Sub-Inspector, Railway Protection Force,
South-Eastern Railway.

Tharivad, a low lying suburb of Bulsar got submerged in about 10 feet of flood water on the morning of 6th August, 1968. Though most of the population managed to leave this area, the rising flood waters and fast currents made escape difficult for 8 women and children who were marooned on the roof of a house. A Railway Protection Force party under the charge of Sub-Inspector Shri B. N. Das rushed to this area. By that time the flood water had come up to the level of the roof of the house. The Rescue Party could not get boats or raft to save the marooned people. In this situation, Shri Das, in utter disregard of his personal safety, plunged into the deluge and through the swirling waters swam to the house where the victims were marooned. With the aid of an improvised rope-way and with the assistance of other members of the rescue party, he saved all the 8 persons.

Shri B. N. Das had shown extraordinary courage and selfless devotion to duty in saving the lives of these marooned persons.

23. Shri Maran,
Kokkunnuparambil House, Koottilangadi Amsam,
Perintalmanna Taluk, District Malappuram,
Kerala.

On 14th November, 1969 at about 10 A.M., the wife of Constable No. 2617, Shri Varughese of C. Company, Malabar

Special Police, Malappuram, while having her bath at Nooradi (Kadalundi) river, accidentally slipped and fell into 10 feet deep waters of the river. Due to strong current, she lost her control and was carried downstream by the current. On hearing the hue and cry from the onlooking women, Shri Maran who was cutting bamboos on the river side, risking his own life, immediately jumped into the river and brought the woman to the shore in an unconscious condition. Had Shri Maran not acted with promptitude, there was every possibility of her being killed by being dashed at the pillars of the Nooradi bridge downstream.

No. 52-Pres./70.—The President is pleased to award the Police Medal for gallantry to the undermentioned officer of the Tamil Nadu Police :—

Name of the officer and rank

Shri Subbiah Nadar Ramasamy,

Police Constable No. 2166,

Tirunelveli District,

Tamil Nadu.

(Deceased)

Statement of services for which the decoration has been awarded.

On the night of 4th January 1969, Shri Subbiah Nadar Ramasamy alongwith another Police Constable was detailed on night beat duty. At about 3.30 hours on the 5th January 1969 at Kokkirakulam, they noticed a person carrying a box which was later found to have been stolen from the house of one Rajamanickam of Tirunelveli. The Policemen became suspicious and asked the person carrying the box to show them the contents. But the suspect threw down the box and ran into the nearby paddy fields. Shri Ramasamy left his musket with the other constable and chased the suspect, unarmed in the paddy fields. He then grappled with the dangerous criminal regardless of the personal risk involved, who, in a desperate bid to escape fatally stabbed Ramasamy on his throat and ran away. The dead body of Shri Ramasamy was later found in the paddy fields by the Police search party. Shri Ramasamy laid his life in grappling unarmed with a dangerous criminal, regardless of personal risk.

Shri Subbiah Nadar Ramasamy showed conspicuous courage and devotion to duty in the performance of which he laid down his life.

2. This award is made for gallantry under rule 4(i) of the rules governing the award of the Police Medal and consequently carries with it the special allowance admissible under rule 5, with effect from the 5th January 1969.

No. 53-Pres./70.—The President is pleased to award the Police Medal for gallantry to the undermentioned officer of the Central Reserve Police :—

Name of the officer and rank

Shri C. R. Singh,

Commandant,

38th Battalion, Central Reserve Police.

Statement of services for which the decoration has been awarded.

In July 1969 the hostiles set fire to a Bazar, plundered properties and perpetrated atrocities in Bulongpasa village near Indo-Pak border. On 22nd July 1969 Shri C. R. Singh was deputed to prevent and encounter the hostiles. The police party reached Gandacherra Police Station at about 0030 hours on 23rd July 1969, which included journey on a road which is hardly jeepable and had become slippery and slushy due to heavy downpour. On reaching Gandacherra Police Station, he was informed that the hostiles were expected to attack the Police Station that night. At about 0400 hours on 23rd July 1969 about 100-150 hostiles attacked the Police Station with 3.5" rockets, automatic rifles and mortars. Even though the police party was much smaller in number, Shri Singh instilled confidence amongst the policemen and routed the hostiles. After having failed in their attempt to overrun the Police Station the hostiles tried to set fire to some bashes near the Cooperative building and other buildings in that area and climbed up the hillock on which these buildings were situated. Here again, Shri Singh inspired his men to combat the attack by taking advantageous position. He himself rushed to the place of fire in disregard of his personal safety, brought out the precious articles and extinguished the fire. The hostiles were completely demoralised and retreated into the jungle. He

thus foiled the attempts of the hostiles with bold determination, remarkable leadership and conspicuous gallantry.

Shri C. R. Singh displayed a high sense of devotion to duty and exemplary courage in facing the hostiles.

2. This award is made for gallantry under rule 4(i) of the rules governing the award of the Police Medal.

P. N. KRISHNA MANI, Jt. Secy. to the President.

MINISTRY OF FOOD, AGRICULTURE, COMMUNITY DEVELOPMENT AND COOPERATION

(Department of Agriculture)

RESOLUTION

New Delhi, the 29th August 1970

No. 25-13/68-G.C.—Agriculture has a dominant role in the Indian economy contributing nearly half of the national income, providing employment to about 70% of the working population and accounting for a sizable share of the country's foreign exchange earnings.

2. Population has been increasing at a rapid rate, leading to increase in demands for food and other consumer goods, many of which have an agricultural base. There is a legitimate aspiration of the people in rural areas to improve their standards of living and to share the fruits of development.

3. Rapid improvement in agriculture is possible through advances in research and technological innovations, larger utilisation of inputs and reduction in dependence on the vagaries of weather through irrigation and other improved practices. Recent trends have thrown up vast possibilities of an accelerated growth in Indian agriculture. The experience of the Intensive Agricultural Development Programme (Package Programme), Intensive Agricultural Area Programme and the introduction of the new strategy have shown that the farmers are responsive to the adoption of scientific and improved agricultural practices and to the incentive of prices. Notable breakthrough has been achieved in respect of one or two crops and there is the promise of a similar breakthrough in respect of other cereal crops and some non-food crops. There has been increasing evidence of investment in irrigation and other facilities both from private and institutional resources with a view to reducing the dependence on vagaries of weather. The utilisation of technological and non-farm inputs has also been growing at a rapid rate. The development of transport and other facilities is opening up the rural areas and is providing outlet for the farm produce.

4. During the very process of this development, the need for taking measures to ensure that the benefits of the new technology are shared by the bulk of the farming population and are not limited to better-off class of farmers has become obvious. It has become clear that besides the irrigated area which permit of intensive development through multiple-cropping and application of inputs in intensive doses, there are large tracts under rain-fed agriculture requiring special attention both in the matter of evolution of the appropriate technology suited to those areas and of making available the necessary resources to the farmers. Moreover, currently, while there have been impressive increases in foodgrains, critical shortages are developing in respect of fat and protein production. It is, therefore, necessary to diversify agriculture between crops and to extend the new technology to horticultural crops also. The overall objective should be to secure integrated development of agriculture, animal husbandry, poultry, inland fisheries and forestry for ensuring a balanced diet and development.

5. The possibilities of progress in different directions have made it incumbent to take a coordinated and forward view of the different aspects of development. In spheres such as those dealing with the problems of unemployment and reduction in the disparities between the low and high income farmers as well as irrigated and rain-fed areas, urgent action is necessary. The existing arrangements for research and extension which are basic for sustaining the tempo of development have also to be reviewed for coping with the challenges posed by the adoption of new technology and providing a two-way channel of communication between the farmer and the scientist.

6. All in all, it has to be ensured that the development of agriculture caters to the welfare of the vast multitudes of population living in the rural areas.

It is in this background that the Government of India have taken the decision to set up a National Commission to enquire into the progress, problems and potential of Indian Agriculture. In status as well as in the assignment given to it, the Commission will be of the highest level and Government are confident that its report and recommendations would have a far-reaching and historic impact on the further development of Indian agriculture in all its aspects.

8. In the context of the agricultural situation described in the foregoing paragraphs, the terms of reference of the Commission will be as follows :

1. To examine comprehensively the current progress of agriculture in India and to make recommendations for its improvement and modernisation with a view to promoting the welfare and prosperity of the people;
2. In particular, to investigate and report on the following aspects of agriculture;

A. Crop Production and Land and Water Development.

- (i) Economics of land and water utilisation and the patterns, and scope for expansion of crops for balanced and nutritious food, industrial uses and exports with special reference to the need and scope for development of horticulture;
- (ii) Problems of soil and moisture conservation, particularly those related to the catchment areas of the major irrigation projects on the one hand and the composite implementation of soil conservation measures and improved agricultural practices on the other;
- (iii) Problems of water management and ground water exploitation in relation to other surface irrigation projects, major and minor;
- (iv) Programmes for land reclamation and development with special consideration of the needs of areas affected by soil salinity;
- (v) Requirements of the new strategy of scientific agriculture in the shape of requisite supplies of inputs and production requisites with special consideration of sources of supply and problems and in particular—
 - (a) multiplication, distribution of high-yielding varieties of seed and other improved seeds,
 - (b) propagation of soil nutrients including chemical fertilisers and other organic manures,
 - (c) measures for plant protection keeping in view the risk of pollution, and
 - (d) agricultural credit from Government, cooperative and other institutional agencies;
- (vi) The scope and long and short-term potentiality for mechanisation of agriculture in the context of the introduction of advanced technology involving the use of high yielding varieties and adoption of multiple cropping without having adverse affect on rural employment situation.

B. Animal Products, Fishery and Forestry.

- (i) Development of animal husbandry both for providing nutritious diet to the population, draft power for agricultural operations and income and employment opportunities to the rural population;
- (ii) Development of poultry, piggy, sheep and goats for increasing income and employment opportunities in the rural areas, besides contribution to balanced diet;
- (iii) Measures necessary for disease control in animal population to increase their efficiency;
- (iv) Development of fisheries, marine, inland and estuarine for increasing income and employment opportunities for the weaker section of population dependent for their livelihood on this occupation, besides their contribution to balanced diet and export earnings;
- (v) Development of forestry, including farm forestry as a factor in agricultural progress and as a source of raw material for industry, exports as well as for sustaining the ecological balance in nature, and for

providing employment opportunities to large sections of tribal and other population living in these areas;

C. Research, Education and Training.

- (i) Achievements, deficiencies and potential of the development of agricultural research and steps needed for promotion of agricultural research and its application to field conditions in the context of fast developing technology; and the need for scientific demonstrations on farmers' fields, for gearing up extension machinery and for the establishment of a two-way channel between farmers and scientists;
- (ii) Education and training of personnel, (a) at the level of Universities and higher agricultural education, (b) middle level training of personnel engaged in occupations ancillary to agriculture, and (c) training of government and other personnel connected with agricultural development;
- (iii) Role of farmer's training and education, and methods of mobilisation of human resources and ensuring people's participation in agricultural development programmes.

D. Organisation and Supporting Measures.

- (i) Examination of the structure and organisation of existing agencies and personnel both Government and non-Government engaged in the operation of agricultural research and development programmes and improvements and adjustments necessary to suit the changed requirements for the formation of policies, preparation of programmes and implementation of action in the field; and the relative role and responsibilities of Central and State Governments;
- (ii) Development of transport, marketing and storage and processing industries with particular reference to food processing to support the programmes for growth in agricultural production, including horticulture and animal husbandry.

E. Employment and Manpower.

- (i) Employment potential of agricultural sector and the implications of the goal of full employment in agriculture for policies and programmes;
- (ii) Scope for pilot projects to demonstrate the types of schemes necessary for creating employment opportunities in the rural areas,
- (iii) Manpower requirements for agricultural programmes and methods of recruitment and training;
- (iv) Problems of small farmers and agricultural labour viewed in the context of social justice and equality of opportunity and as a factor in securing effective participation of the bulk of the Indian peasantry in stepping up agricultural production;

F. Other Aspects.

- (i) Concept, potential and measures necessary for integrating area development with special reference to dry and rain-fed areas, command areas of irrigation projects and remote, economically backward, hilly and tribal areas;
- (ii) Land reforms, consolidation of holdings and the link between land reforms and agricultural production;
- (iii) Study of agricultural price problems as a policy of incentives for agricultural production;
- (iv) Crop insurance;
- (v) Availability of reliable and timely agricultural statistics for formulation and implementation of agricultural policies and programmes.

9. The Commission will consist of a Chairman, a Member-Secretary, five full-time Members and 10 part-time Members. It has been decided to appoint Shri C. Subramaniam, formerly Union Minister for Food & Agriculture, as the Chairman of the National Commission. Shri J. S. Sarma, Economic & Statistical Adviser to the Ministry of Food and Agriculture, Government of India and Agricultural Census Commissioner has been appointed as its wholetime Member-Secretary. The other names will be announced later.

10. The Commission will make its recommendations as soon as practicable and in any case within a period of two

years. In particular, the Commission will make interim recommendations on items C(i), D(i), E(i), E(iv) and F(i) of the terms of reference any other items that it may deem fit.

11. The Commission will be free to set up study teams or Sub-Committees for specific disciplines or to study problems in depth. The Commission may also have technical Consultants on whole-time and part-time basis. On any aspect which is covered by the terms of reference of the Commission and which is relevant for its work, if there is any other expert body or Commissions going into these matters, the Commission shall be provided the facility of consultations with such expert bodies and Commissions.

12. The Headquarters of the Commission will be in New Delhi.

13. The Commission will devise its own procedure. It may call for such information and take such evidence as it may consider necessary. The Ministries/Departments of the Government of India will furnish such information and documents and render such assistance as may be required by the Commission.

14. The Government of India trust that the State Governments/Administrations of Union Territories will extend to the Commission their fullest cooperation and assistance.

ORDER

ORDERED that a copy of the Resolution be communicated to the Chairman and Member-Secretary, all Ministries/Departments of the Government of India, the Prime Minister's Secretariat, the President's Secretariat, Planning Commission, Cabinet Secretariat, Comptroller and Auditor General of India, Secretaries to the Government of all States and Union Territories, Agriculture Departments, all Attached and Subordinate Offices of the Ministry of Food, Agriculture, Community Development and Cooperation (Department of Agriculture), the Lok Sabha Secretariat, the Rajya Sabha Secretariat, Parliament Library (5 copies).

ORDERED also that the Resolution be published in the Gazette of India for general information.

The 26th September 1970

No. 6-30, 70-Genl.Coord.—In pursuance of Government of India, Ministry of Food, Agriculture, Community Development and Co-operation (Department of Agriculture) Resolution No. 25-13 '68-Genl.Coord., dated 29th August, 1970 setting up the National Commission on Agriculture, it has been decided that in addition to the Chairman and Member-Secretary (whose names have already been announced), the National Commission on Agriculture would comprise the following :—

(i) Full-time Members :

1. Shri S. K. Mukherjee, Vice-Chancellor, Kalyani University.
2. Dr. H. R. Arakeri, Director of Agriculture, Mysore.
3. Dr. P. Bhattacharya, Retired Animal Husbandry Commissioner.

(ii) Part-time Members :

1. Shri M. V. Krishnappa, Member, Lok Sabha.
2. Shri Randhir Singh, Member, Lok Sabha.
3. Dr. Z. A. Ahmed, Member, Rajya Sabha.
4. Sardar Jogindra Singh, Member, Rajya Sabha.
5. Dr. M. S. Swaminathan, Director, Indian Agricultural Research Institute, New Delhi.
6. Shri D. P. Singh, Vice-Chancellor, Agricultural University, Pantnagar.
7. Shri T. A. Pai, Chairman, Life Insurance Corporation of India.
8. Shri B. S. Nag, formerly Adviser, (I&P), Planning Commission, New Delhi.
9. Dr. A. M. Khusro, Professor of Economics, Institute of Economics Growth, Delhi.
10. Shri Hari Singh, Retired Inspector General of Forests

11. Shri N. K. Panikkar, Director, National Institute of Oceanography.

2. The names of the remaining full-time Members will be announced later.

T. P. SINGH, Secy.

MINISTRY OF RAILWAYS

(Railway Board)

RULES

New Delhi, the 24th October, 1970

No. 70/E(GR)/20/1.—The rules for a competitive examination to be held by the Union Public Service Commission in 1971, for selection of candidates for appointment as Special Class Apprentices in the Indian Railway Service of Mechanical Engineers, are published for general information.

2. The number of vacancies to be filled on the results of the examination will be specified in the Notice issued by the Commission. Reservations will be made for candidates belonging to the Scheduled Castes and the Scheduled Tribes in respect of vacancies as may be fixed by the Government.

Scheduled Castes/Tribes mean any of the Castes/Tribes mentioned in the Constitution (Scheduled Castes) Order, 1950, Constitution (Scheduled Castes) (Part C States) Order, 1951, Constitution (Scheduled Tribes) Order, 1950, and Constitution (Scheduled Tribes) (Part C States) Order, 1951, as amended by the Scheduled Castes and Scheduled Tribes Lists (Modification) Order, 1956 read with the Bombay Reorganisation Act, 1960, and the Punjab Reorganisation Act, 1966, the Constitution (Jammu and Kashmir) Scheduled Castes Order, 1956, the Constitution (Andaman and Nicobar Islands) Scheduled Tribes Order, 1959, the Constitution (Dadra and Nagar Haveli) Scheduled Castes Order, 1962, the Constitution (Dadra and Nagar Haveli) Scheduled Tribes Order, 1962, the Constitution (Pondicherry) Scheduled Castes Order, 1964, the Constitution (Scheduled Tribes) (Uttar Pradesh) Order, 1967, the Constitution (Goa, Daman and Diu) Scheduled Castes Order, 1968 and the Constitution (Goa, Daman and Diu) Scheduled Tribes Order, 1968.

3. The examination will be conducted by the Commission in the manner prescribed in Appendix I to these Rules.

The dates on which and the places at which the examination will be held shall be fixed by the Commission.

4. A candidate must be either

- (a) a citizen of India, or
- (b) a subject of Sikkim, or
- (c) a subject of Nepal, or
- (d) a subject of Bhutan, or
- (e) a Tibetan refugee who came over to India, before the 1st January, 1962, with the intention of permanently settling in India, or
- (f) a person of Indian origin who has migrated from Pakistan, Burma, Ceylon, and the East African countries of Kenya, Uganda and the United Republic of Tanzania (formerly Tanganyika and Zanzibar) with the intention of permanently settling in India.

Provided that a candidate belonging to categories (c), (d), (e) and (f) above shall be a person in whose favour a certificate of eligibility has been issued by the Government of India.

Certificate of eligibility will not, however, be necessary in the case of candidates belonging to any one of the following categories :—

- (i) Persons who migrated to India from Pakistan before the nineteenth day of July, 1948, and have ordinarily been residing in India since then.
- (ii) Persons who migrated to India from Pakistan on or after the nineteenth day of July, 1948, and have got themselves registered as citizens under Article 6 of the Constitution.
- (iii) Non-citizens category (f) above who entered service under the Government of India before the commencement of the Constitution viz., 26th January, 1950, and who have continued in such service since then. Any such person who re-entered or may re-enter such service with break after the 26th Janu-

ary, 1950, will however, require certificate of eligibility in the usual way.

A candidate in whose case a certificate of eligibility is necessary may be admitted to the examination and he may also be provisionally appointed subject to the necessary certificate being given to him by the Government.

5. (a) A candidate must have attained the age of 16 years and must not have attained the age of 19 years on 1st January, 1971 i.e., he must have been born not earlier than 2nd January, 1952, and not later than 1st January, 1955.

(b) The upper age limit prescribed above will be relaxable—

- (i) up to a maximum of five years if a candidate belongs to a Scheduled Caste or a Scheduled Tribe;
- (ii) up to a maximum of three years if a candidate is a *bona fide* displaced person from East Pakistan and has migrated to India on or after 1st January, 1964. This concession shall not, however, be admissible to a candidate who has already appeared at three previous examinations;
- (iii) up to a maximum of eight years if a candidate belongs to a Scheduled Caste or a Scheduled Tribe and is also a *bona fide* displaced person from East Pakistan and has migrated to India on or after 1st January, 1964. This concession shall not, however, be admissible to a candidate who has already appeared at eight previous examinations;
- (iv) up to a maximum of three years if a candidate is a resident of the Union Territory of Pondicherry and has received education through the medium of French at some stage;
- (v) up to a maximum of three years if a candidate is a *bona fide* repatriate of Indian origin from Ceylon and has migrated to India on or after 1st November, 1964, under the Indo-Ceylon Agreement of October, 1964. This concession shall not, however, be admissible to a candidate who has already appeared at three previous examinations;
- (vi) up to a maximum of eight years if a candidate belongs to a Scheduled Caste or a Scheduled Tribe and is also a *bona fide* repatriate of Indian origin from Ceylon and has migrated to India on or after 1st November, 1964, under the Indo-Ceylon Agreement of October, 1964. This concession shall not, however, be admissible to be a candidate who has already appeared at eight previous examinations;
- (vii) up to a maximum of three years if a candidate is a resident of the Union Territory of Goa, Daman and Diu;
- (viii) up to a maximum of three years if a candidate is of Indian origin and has migrated from Kenya, Uganda and the United Republic of Tanzania (formerly Tanganyika and Zanzibar);
- (ix) up to a maximum of three years if a candidate is a *bona fide* repatriate of Indian origin from Burma and has migrated to India on or after 1st June, 1963. This concession shall not, however, be admissible to a candidate who has already appeared at three previous examinations;
- (x) up to a maximum of eight years if a candidate belongs to a Scheduled Caste or a Scheduled Tribe and is also a *bona fide* repatriate of Indian origin from Burma and has migrated to India on or after 1st June, 1963. This concession shall not, however, be admissible to a candidate who has already appeared at eight previous examinations;
- (xi) up to a maximum of three years in the case of Defence Services personnel disabled in operations during hostilities with any foreign country or in a disturbed area and released as a consequence thereof. This concession shall not, however, be admissible to a candidate who has already appeared at three previous examinations; and
- (xii) up to a maximum of eight years in the case of Defence Services personnel disabled in operations during hostilities with any foreign country or in a disturbed area, and released as a consequence thereof; who belong to the Scheduled Castes or the Scheduled Tribes. This concession shall not, however, be admissible to a candidate who has already appeared at eight previous examinations.

SAVE AS PROVIDED ABOVE, THE AGE LIMITS PRESCRIBED CAN IN NO CASE BE RELAXED.

6. A candidate—

- (a) must have passed in the first or second division the Intermediate or an equivalent Examination of a University or Board approved by the Government of India with Mathematics and at least one of the subjects Physics and Chemistry as subjects of the examination.

Graduates with Mathematics and at least one of the subjects Physics and Chemistry as their degree subjects may also apply; or

- (b) must have passed the first year Examination under the three-year degree course of a University or the first examination of the three-year diploma course in Rural Services of the National Council for Rural Higher Education, with Mathematics and at least one of the subjects Physics and Chemistry as subjects of the examination provided that before joining the degree/diploma course he passed the Higher Secondary Examination or the Pre-University or equivalent Examination in the first or second division or obtain the Cambridge School Certificate/Indian School Certificate with at least five credits including credits in Mathematics; and at least in one of the subjects Physics and Chemistry.

Candidates who have passed the first/second year Examination under the three-year degree course in the first or second division with Mathematics and either Physics or Chemistry as subjects of the Examination may also apply, provided the first/second year Examination is conducted by a University; or

- (c) must have passed in the first or second division the pre-Engineering Examination of the Delhi Polytechnic, Delhi or of a University approved by the Government of India; or

- (d) must have passed in the first or second division the Pre-Professional/Pre-Technological Examination of an Indian University or a recognised Board, with Mathematics and at least one of the subjects Physics and Chemistry as subjects of the examination, conducted one year after the Higher Secondary or pre-University stage; or

- (e) must have passed the first year Examination under the five year Engineering Degree Course of a University, provided that before joining the Degree course, he passed the Higher Secondary Examination or Pre-University, or equivalent examination in the first or second division or obtained the Cambridge School Certificate/Indian School Certificate with at least five credits including credits in Mathematics and at least in one of the subjects Physics and Chemistry.

Candidates who have passed the first year Examination of the five-year Engineering Degree Course in the first or second division may also apply, provided the first year Examination is conducted by a University.

NOTE I.—Candidates who are not awarded any specific division by the University/Board either in the Intermediate or any other examination mentioned above will be considered educationally eligible provided their aggregate of marks falls within the range of marks for first or second division as prescribed by the University/Board concerned.

NOTE II.—A candidate who has appeared at an examination the passing of which would render him eligible to appear at the examination but has not been informed of the result may apply for admission to the examination. A candidate who intends to appear at such a qualifying examination may also apply provided that the qualifying examination is completed before the commencement of this examination. Such candidates will be admitted to the examination, if otherwise eligible but the admission would be deemed to be provisional and subject to cancellation if they do not produce proof of having passed the examination, as soon as possible, and in any case not later than two months after the commencement of this examination.

NOTE III.—In exceptional cases, the Commission may treat a candidate, who has not any of the qualifications prescribed in this rule, as educationally qualified provided that

he possesses qualifications the standard of which, in the opinion of the Commission, justifies his admission to the examination.

7. Candidates must pay the fee prescribed in Annexure I to the Commission's Notice.

8. A candidate already in Government Service, whether in a permanent or a temporary capacity, must obtain prior permission of the Head of the Department to appear for the Examination.

9. The decision of the Commission as to the eligibility or otherwise of a candidate for admission to the examination shall be final.

10. No candidate will be admitted to the examination unless he holds a certificate of admission from the Commission.

11. Any attempt on the part of a candidate to obtain support for his candidature by any means may disqualify him for admission.

12. A candidate who is or has been declared by the Commission guilty of impersonation or of submitting fabricated documents or documents which have been tampered with or of making statements which are incorrect or false or of suppressing material information or otherwise resorting to any other irregular or improper means for obtaining admission to the examination, or of using or attempting to use unfair means in the examination hall or of misbehaviour in the examination hall may, in addition to rendering himself liable to criminal prosecution,—

(a) be debarred permanently or for a specified period:—

(i) by the Commission, from admission to any examination or appearance at any interview held by the Commission for selection of candidates; and

(ii) by the Central Government from employment under them;

(b) be liable to disciplinary action under the appropriate rules, if he is already in service under Government.

13. Candidates who obtain such minimum qualifying marks in the written examination, as may be fixed by the Commission in their discretion, shall be summoned by them for the Personality Test.

14. After the examination, the candidates will be arranged by the Commission in the order of merit as disclosed by the aggregate marks finally awarded to each candidate; and in that order so many candidates as are found by the Commission to be qualified by the examination shall be recommended for appointment up to the number of unreserved vacancies decided to be filled on the results of the examination.

Provided that any candidate belonging to the Scheduled Castes or the Scheduled Tribes who though not qualified by the standard prescribed by the Commission for the Service is declared by them to be suitable for appointment thereto with due regard to maintenance of efficiency of administration shall be recommended for appointment to vacancies reserved for members of the Scheduled Castes and the Scheduled Tribes, as the case may be, in the Service.

15. The form and manner of communication of the result of the examination to individual candidates shall be decided by the Commission in their discretion and the Commission will not enter into correspondence with them regarding the result.

16. Success in the examination confers no right to appointment, unless Government are satisfied, after such enquiry as may be considered necessary that the candidate is suitable in all respects for appointment to the Railway Service.

17. A candidate must be in good mental and bodily health and free from any physical defect likely to interfere with the discharge of his duties as an officer of the Service. A candidate, who after such medical examination as Government or the appointing authority, as the case may be, may prescribe is found not to satisfy these requirements, will not be appointed. Only such candidates as are likely to be considered for appointment will be medically examined. Candidates will have to pay a fee of Rs. 16.00 to the Medical Board concerned at the time of the medical examination.

NOTE.—In order to prevent disappointment candidates are advised to have themselves examined by a Government medical officer of the standing of a Civil Surgeon, before applying

for admission to the examination. Particulars of the nature of the medical test to which candidates will be subjected before appointment and of the standards required are given in Appendix II to these Rules. For the disabled ex-Defence Services personnel the standards will be relaxed consistent with the requirements of the service.

18. No person

(a) who has entered into or contracted a marriage with a person having a spouse living, or

(b) who, having a spouse living, has entered into or contracted a marriage with any person,

shall be eligible for appointment to service.

Provided that the Central Government may, if satisfied that such marriage is permissible under the personal law applicable to such person and the other party to the marriage and there are other grounds for so doing, exempt any person from the operation of this rule.

19. Conditions of apprenticeship for the Special Class Apprentices selected through this examination are given in Appendix III. Brief particulars relating to the Indian Railway Service of Mechanical Engineers are also given in Appendix IV.

C. S. PARAMESWARAN,
Secy. Railway Board.

APPENDIX I

(See Rule 3)

The examination shall be conducted according to the following plan:

Part I—Written examination carrying a maximum of 600 marks in the subjects as shown below:

Part II—Personality Test (including psychological tests) carrying a maximum of 400 marks. (Vide Rule 13).

2. The subjects of the written examination under Part I, the time allowed and the maximum marks allotted to each subject/paper shall be as follows:—

S. No.	Subject	Time Allowed	Maximum Marks
1.	English	2 hours	150
2.	Science and General knowledge	2 hours	150
3.	Mathematics		
	PAPER I		
	Algebra, Plane Geometry and Elementary Mensuration, and Analytical Geometry	2 hours	150
	PAPER II		
	Elementary Trigonometry, Elements of Differential Calculus and Statics and Dynamics.	2 hours	150

3. CANDIDATES ARE EXPECTED TO BE FAMILIAR WITH THE METRIC SYSTEM OF WEIGHTS AND MEASURES. IN THE QUESTION PAPERS, WHEREVER NECESSARY, QUESTIONS INVOLVING THE USE OF METRIC SYSTEM OF WEIGHTS AND MEASURES MAY BE SET.

4. Question papers will be approximately of the Intermediate standard.

5. All papers must be answered in English.

6. Candidates must write the answers in their own hand. In no circumstances will they be allowed the help of a scribe to write the answers for them.

7. The syllabus for the examination will be as shown in the attached Schedule.

8. The Commission have the discretion to fix qualifying marks in any or all the subjects at the examination.

9. Marks will not be allotted for mere superficial knowledge.

10. Deduction up to 5 per cent of the maximum marks for the written subjects will be made for illegible handwriting.

11. Credit will be given for orderly, effective and exact expression combined with due economy of words in all subjects of the examination.

SCHEDULE

ENGLISH.—The questions will be designed to test the candidate's understanding and command of the language. Among other tests a passage will be set for the précis.

Science and General Knowledge

The question paper is intended to test the candidates' general scientific knowledge in Physics and Chemistry; and General Knowledge, including Geography, History and Current Affairs. The question paper will have three parts, viz., A, B and C, each containing 4 questions. Candidates will be required to attempt 3 questions from each part.

PART A—Physics

Three states of matter. Simple measurements of length, mass and time.

Motion of particles in a straight line. Newton's Laws of motion. Uniform circular motion. Simple harmonic motion.

Equilibrium of bodies under the action of forces. Gravitation and gravity. Escape velocity.

Work, energy and power.

Principle of Archimedes. Floating bodies. Determination of specific gravity. Atmospheric pressure.

Measurement of temperature. Heat and expansion. Simple calorimetry. Gas Laws. Change of state. Heat as energy. Transmission of heat. Laws of Thermodynamics. Heat engines.

Wave motion. Velocity of sound. Vibrating bodies. Reverberation and echo.

Rectilinear propagation of light. Shadows and eclipses. Reflection and refraction. Mirrors, lenses and prisms. The spectrum. Simple optical instruments.

Properties of a magnet. Magnetic field and magnetic moment. Elements of the earth's magnetic field. Dia—Para—, and Ferro-magnetism.

Coulomb's law. The electric field. Potential and potential difference. Current and resistance. Conductor, semi-conductor and insulator. Ohm's law. Series and parallel combination of resistances. Galvanometers and Shunts. Ammeter and voltmeter. Potentiometer.

Heating effect, magnetic effect and chemical effect of electric current. Laws of electrolysis. Primary and storage cells. Battery chargers.

Generation and distribution of alternating current.

PART B—Chemistry

Physical and chemical changes. Laws of chemical combination. Atoms and molecules. Atomic weights, molecular weights, equivalent weights. Valency and chemical bonds. Periodic classification and elements. Oxidation and reduction —electronic concept.

Hydrogen, oxygen, ozone, water, hydrogen peroxide. Acids, bases and salts. Halogens, hydrogen halides and important oxyacids and oxy-salts of halogens. Sulphur, hydrogen sulphide, sulphur dioxide and sulphuric acid. Nitrogen, ammonia, oxides of nitrogen, nitric acid, Phosphorus, oxides of phosphorus, phosphoric acids. Carbon, carbon monoxide, carbon dioxide.

Occurrence of metals, and general principles of their extraction. Sodium, calcium, magnesium, aluminium, zinc, lead, tin, copper, silver, iron, and their important compounds, alloys and their uses.

Elements of organic chemistry: Purification of, and detection and estimation of elements in, organic compounds. Aliphatic compounds: Hydrocarbons; halogen derivatives; alcohols; ethers; aldehydes and ketones; fatty acids, substituted fatty acids and polybasic acids; esters; acid chlorides and anhydrides; acid amides; amines; carbohydrates. Aromatic compounds: Benzene, toluene and their halogen-, nitro-, hydroxy-, and sulphonie acid derivatives; aniline and diazonium compounds; benzaldehyde; benzoic acid and benzoates; Salicylic acid and salicylates.

PART C—General Knowledge including Geography, History and Current Affairs.

GENERAL—Eminent scientists and their achievements

Elementary knowledge of the human body and its important organs. Common epidemics, their causes, means of prevention and cure.

GEOGRAPHY

Shape and movements of the earth. Seasons. Climate and weather. Main climatic and vegetable regions. Earth's crust, erosion, transportation and deposition. Earthquakes and volcanoes. Tides and ocean currents. Human occupations and activities in relation to geographical factors.

Geography of India with special reference to mountains, rivers and human occupations. Main industries and their distribution. Agriculture and important crops. Forest wealth, flora and fauna of the land and the sea.

HISTORY

Broad outline knowledge of Indian History. Ancient Indian culture and civilization as inferred from monuments, ancient buildings and literature. Growth of self-government in India, and the national struggle for freedom. The great religions of India.

Elementary knowledge of major events of international importance in world history, including important reforms, and important industrial and national movements.

CURRENT AFFAIRS

Broad features of the Constitution of India. Important measures of legislation undertaken by the Parliament and the State legislatures in India. Basic features of India's policy relating to foreign affairs. Knowledge of important events that have happened in India and abroad during the past two years. Important personalities, both Indian and foreign. Sports and cultural activities of outstanding importance.

MATHEMATICS—There will be two papers.

Paper I—Algebra, Plane Geometry and Elementary mensuration and Analytical Geometry.

Paper II—Elementary Trigonometry, Elements of Differential Calculus, and Statics and Dynamics.

The following syllabus is designed to indicate the scope of each subject included in these papers. The questions will be of a type to test the candidate's understanding of and the power of applying the basic principles of the subject rather than his knowledge of book work and standard methods.

PAPER I

Algebra

Formulae, their evaluation and transformation, notion of a function; rate of change, factors; fractions; the gradient and area of a graph; quadratic expressions; solution of equations, linear and quadratic simple and simultaneous, use of Logarithms; simple properties of positive, negative and fractional indices; Arithmetical and Geometrical progression.

Plane Geometry and Elementary Mensuration of prism Pyramid, right circular cone and Cylinder

The substance of Euclid's six books; elementary ideas in Solid Geometry; Planes, rectangular blocks, wedges, pyramids, cylinders, cones and spheres.

Analytical Geometry

Simple properties of straight lines, circle, parabola, ellipse and hyperbola.

NOTE.—Candidates will be allowed the use of four figure Log Tables.

PAPER II

Elementary Trigonometry

Trigonometrical ratios and their graphs; addition theorems; identities; simple trigonometrical equations; heights and distances.

Elements of Differential Calculus

Differentiation of simple functions, application to tangents and normals of simple curves.

Statics and Dynamics

Statics.—Coplaner forces; simple cases of equilibrium; moments; centre of gravity; work and power; simple machines.

Dynamics.—Velocity; acceleration; motion under gravity in a vertical plane and down a smooth inclined plane; motion of two masses connected by a string; conservation of energy.

NOTE.—Candidates will be allowed the use of four figure Log Tables.

PERSONALITY TEST

Psychological Tests.—Candidates called for Personality Tests will be required to undergo psychological tests designed to assess their basic intelligence and mechanical aptitude.

Interview.—Each candidate will be interviewed by a Board who will have before them a record of his career both academic and extramural. They will be asked questions on matters of general interest. Special attention will be paid to assessing their potential qualities of leadership, initiative and intellectual curiosity, tact and other social qualities, mental and physical energy, power of practical application and integrity of character.

APPENDIX II**REGULATIONS FOR THE PHYSICAL EXAMINATION OF CANDIDATES FOR APPOINTMENT TO THE INDIAN RAILWAY SERVICE OF MECHANICAL ENGINEERS.**

[These regulations are published for the convenience of candidates and in order to enable them to ascertain the probability of their coming up to the required physical standard. The regulations are also intended to provide guide lines to the medical examiners and a candidate who does not satisfy the minimum requirements prescribed in the regulations cannot be declared fit by the medical examiners. However, while holding that a candidate is not fit according to the norms laid down in these regulations, it would be permissible for a Medical Board to recommend to the Government of India for reasons specifically recorded in writing that he may be admitted to service without disadvantage to Government.]

It should, however, be clearly understood that the Government of India reserve to themselves absolute discretion to reject or accept any candidate after considering the report of the Medical Board.]

1. To be passed as fit for appointment a candidate must be in good mental and bodily health and free from any physical defect likely to interfere with the efficient performance of the duties of his appointment.

2. (a) In the matter of the correlation of age, height and chest girth of candidates of Indian (including Anglo-Indian) race, it is left to the Medical Board to use whatever correlation figures are considered most suitable as a guide in the examination of the candidates. If there be any disproportion with regard to height, weight and chest girth, the candidate should be hospitalised for investigation and X-Ray of the chest taken before the candidate is declared fit or not fit by the Board.

(b) However, the minimum standards for height and chest girth, without which candidates cannot be accepted, are as follows:

	Height	Chest girth fully expanded	Expansion
Male candidates	152 cm	84 cm	5 cm
Female candidates	150 cm	79 cm	5 cm

The minimum height prescribed is relaxable in case of candidates belonging to races such as Gorkhas, Garhwals, Assamese, Nagaland Tribals, etc., whose average height is distinctly lower.

3. The candidate's height will be measured as follows:—

He will remove his shoes and be placed against the standard with his feet together and the weight thrown on the heels and not on the toes or other sides of the feet. He will stand erect without rigidity and with the heels, calves, buttocks and shoulders touching the standard; the chin will be

depressed to bring the vertex of the head level under the horizontal bar and the height will be recorded in centimetres and parts of a centimetre to halves.

4. The candidate's chest will be measured as follows:—

He will be made to stand erect with his feet together and to raise his arms over his head. The tape will be so adjusted round the chest that its upper edge touches the inferior angles of the shoulder blades behind and lies in same horizontal plane when the tape is taken round the chest. The arms will then be lowered to hang loosely by the side, and care will be taken that the shoulders are not thrown upwards or backwards so as to displace the tape. The candidate will then be directed to take a deep inspiration several times and the maximum expansion of the chest will be carefully noted, and the minimum and maximum will then be recorded in centimetres, thus 84-89, 86-93, etc. In recording the measurements, fractions of less than 1 centimetre should not be noted.

N.B. The height and chest of the candidate should be measured twice before coming to a final decision.

5. The candidate will also be weighed and his weight recorded in kilograms; fractions of half a kilogram should not be noted.

6. The candidate's eyesight will be tested in accordance with the following rules. The result of each test will be recorded.

(i) **General.**—The candidate's eyes will be submitted to a general examination directed to the detection of any disease or abnormality. The candidate will be rejected if he suffers from any squint or morbid conditions of eyes, eye lids or contiguous structures of such a sort as to render or are likely at a future date to render him unfit for service.

(ii) **Visual Acuity.**—The examination for determining the acuteness of vision includes two tests, one for distant, the other for near vision. Each eye will be examined separately.

There shall be no limit for minimum naked eye vision but the naked eye vision of the candidates shall, however, be recorded by the Medical Board or other medical authority in every case, as it will furnish the basic information in regard to the condition of the eye.

The candidate will be examined with the apparatus and according to the method prescribed by the Railway Board's Standing Advisory Committee of Medical Officers, to determine his acuity of vision.

N.B.—No candidate will be accepted for appointment whose standard of vision does not come up to requirement specified below:

The standard of visual acuity with or without glasses should be as follows:—

	Distant Better Eye	Vision Worse Eye	Near Better Eye	Vision Worse Eye
For candidates below 35 years of age.	6/6 or 6/9	6/12 or 6/9	II	II

NOTE: (1)

(a) Total Myopia (including the cylinder) shall not exceed —4.00D.

(b) Total Hypermetropia (including the cylinder) shall not exceed +4.00D.

(c) In every case of myopia fundus examination should be carried out and the results recorded. In the event of any pathological condition being present which is likely to be progressive and affect the efficiency of the candidate he shall be declared unfit.

NOTE: (2)

Colour Vision:

The testing of colour vision is compulsory and the results should be normal in respect of all candidates. Satis-

factory colour vision constitutes recognition of signal red, green and white colours with ease and without hesitation. Both the Ishihara's plates and Fdridge's Green lantern shall be used for testing colour vision.

Colour perception should be graded into a higher and lower grade depending upon the size of the aperture in the lantern as described below :

Grade	Higher Grade of Colour Perception	Lower Grade of Colour Perception
1. Distance between the lamp and the candidate	16'	16'
2. Size of the aperture	1.3 mm	13 mm
3. Time of exposure	5 seconds	5 seconds

Higher grade of colour perception is essential for Special Class Apprentices.

NOTE : (3)

Field of vision :

The field of vision shall be tested in respect of all Services by the confrontation method. Where such test gives unsatisfactory or doubtful results the field of vision should be determined on the perimeter.

NOTE : (4)

Night Blindness :

Night blindness need not be tested as a routine, but only in special cases. No standard test for the testing of night blindness or dark adaptation is prescribed. The Medical Board should be given the discretion to improvise such rough tests e.g. recording of visual acuity with reduced illumination or by making the candidate recognise various objects in a darkened room after he has been there for 20 to 30 minutes. Candidate's own statements should not always be relied upon, but they should be given due consideration.

NOTE : (5)

Ocular conditions other than visual acuity :

- Any organic disease or a progressive refractive error which is likely to result in lowering the visual acuity should be considered as a disqualification.
- Squint* : The presence of binocular vision is essential. Squint, even if the visual acuity is of the prescribed standard, should be considered as a disqualification.
- One eyed person* : One eyed persons will not be eligible for appointment.

NOTE : (6)

Contact Lenses :

During the medical examination of a candidate, the use of contact lenses is not to be allowed. It is necessary that when conducting eye test, the illumination of the type letters for distant vision should have an illumination of 15 foot-candles.

NOTE : (7)

It shall be open to Government to relax any one of the conditions in favour of any candidate for special reasons.

7. Blood Pressure :

The Board will use its discretion regarding Blood Pressure. A rough method of calculating normal maximum systolic pressure is as follows :—

- With young subjects 15—25 years of age the average is about 100 plus the age.
- With subjects over 25 years of age the general rule of 110 plus half the age seems quite satisfactory

N.B.—As a general rule any systolic pressure over 140 and diastolic over 90 should be regarded as suspicious and the candidate should be hospitalised by the Board before giving their final opinion regard-

ing the candidate's fitness or otherwise. The hospitalization report should indicate whether the rise in blood pressure is of a transient nature due to excitement etc. or whether it is due to any organic disease. In all such cases X-Ray and electrocardiographic examination of heart and blood urea clearance test should also be done as a routine. The final decision as to fitness or otherwise of a candidate will, however, rest with the medical board only.

Method of taking Blood Pressure :

The mercury manometer type of instrument should be used as a rule. The measurement should not be taken within fifteen minutes of any exercise or excitement. Provided the patient, and particularly his arm is relaxed, he may be either lying or sitting. The arm is supported comfortably, at the patient's side in a more or less horizontal position. The arm should be freed from clothes to the shoulder. The cuff completely deflated, should be applied with the middle of the rubber over the inner side of the arm and its lower edge an inch or two above the bend of the elbow. The following turns of cloth bandage should be spread evenly over the bag to avoid bulging during inflation.

The brachial artery is located by palpitation at the bend of the elbow and the stethoscope is then applied lightly and centrally over it below, but not in contact with the cuff. The cuff is inflated to about 200 mm. Hg. and then slowly deflated. The level at which the column stands when soft successive sounds are heard represents the Systolic Pressure. When more air is allowed to escape the sounds will be heard to increase in intensity. The level at which well-heard clear sounds change to soft muffled fading sounds represents the diastolic pressure. The measurements should be taken in a fairly brief period of time as prolonged pressure of the cuff is irritating to the patient and will vitiate the readings. Re-checking, if necessary, should be done only a few minutes after complete deflation of the cuff. (Sometimes, as the cuff is deflated sounds are heard at a certain level they may disappear as pressure falls and reappear at a still lower level. This Silent Gap may cause error in reading).

8. The urine (passed in the presence of the examiner) should be examined and the result recorded. Where a Medical Board finds sugar present in a candidate's urine by the usual chemical tests, the Board will proceed with the examination with all its other aspects and will also specially note any signs or symptoms suggestive of the diabetes if except for the glycosuria the Board finds the candidate conforms to the standard of medical fitness required, they may pass the candidate "fit subject to the glycosuria being non-diabetic" and the Board will refer the case to a specified specialist in Medicine who has hospital and laboratory facilities at his disposal. The Medical Specialist will carry out whatever examinations, clinical and laboratory, he considers necessary including a standard blood sugar tolerance test, and will submit his opinion to the Medical Board, upon which the Medical Board will base its final opinion "fit" or "unfit". The candidate will not be required to appear in person before the Board on the second occasion. To exclude the effects of medication it may be necessary to retain a candidate for several days in hospital, under strict supervision.

9. A woman candidate who as a result of tests is found to be pregnant of 12 weeks standing or over, should be declared temporarily unfit until the confinement is over. She should be re-examined for a fitness certificate six weeks after the date of confinement, subject to the production of a medical certificate of fitness from a registered medical practitioner

10. The following additional points should be observed :—

- that the candidate's hearing in each ear is good and that there is no sign of disease of the ear. In case it is defective the candidate should be got examined by the ear specialist;
- that his speech is without impediment;
- that his teeth are in good order and that he is provided with dentures where necessary for effective mastication (well filled teeth will be considered as sound);
- that the chest is well formed and his chest expansion sufficient and that his heart and lungs are sound;
- that there is no evidence of any abdominal disease;
- that he is not ruptured;

- (g) that he does not suffer from hydrocele, severe degree of varicocele, varicose veins or piles;
- (h) that his limbs, hands and feet are well formed and developed and that there is free and perfect motion of all his joints;
- (i) that he does not suffer from any inveterate skin disease;
- (j) that there is no congenital malformation or defect;
- (k) that he does not bear traces of acute or chronic disease pointing to an impaired constitution;
- (l) that he bears marks of efficient vaccination; and
- (m) that he is free from communicable disease.

11. Radiographic examination of the chest should be done as a routine in all cases for detecting any abnormality of the heart and lungs, which may not be apparent by ordinary physical examination.

When any defect is found it must be noted in the Certificate and the medical examiner should state his opinion whether or not it is likely to interfere with the efficient performance of the duties which will be required of the candidate.

NOTE.—Candidates are warned that there is no right of appeal from a Medical Board, special or standing, appointed to determine their fitness for the above Service. If, however, Government are satisfied on the evidence produced before them of the possibility of an error of judgment in the decision of the first Board, it is open to Government to allow an appeal to a second Board. Such evidence should be submitted within one month of the date of the communication in which the decision of the first Medical Board is communicated to the candidate, otherwise no request for an appeal to a second Medical Board will be considered.

If any medical certificate is produced by a candidate as a piece of evidence about the possibility of an error of judgment in the decision of the first Board, the certificate will not be taken into consideration unless it contains a note by the medical practitioner concerned to the effect that it has been given in full knowledge of the fact that the candidate has already been rejected as unfit for service by the Medical Board.

Medical Board's Report

The following intimation is made for the guidance of the Medical Examiner :

1. The standard of physical fitness to be adopted should make due allowance for the age and length of service, if any, of the candidate concerned.

No person will be deemed qualified for admission to the Public Service who shall not satisfy Government, or the appointing authority, as the case may be, that he has no disease, constitutional affection, or bodily infirmity unfitting him, or likely to unfit him for that service.

It should be understood that the question of fitness involves the future as well as the present and that one of the main objects of medical examination is to secure continuous effective service, and in the case of candidates for permanent appointment to prevent early pension or payments in case of premature death. It is at the same time to be noted that the question is one of the likelihood of continuous effective service, and that rejection of a candidate need not be advised on account of the presence of a defect which in only a small proportion of cases is found to interfere with continuous effective service.

A lady doctor will be co-opted as a member of the Medical Board whenever a woman candidate is to be examined.

The report of the medical board should be treated as confidential.

In cases where a candidate is declared unfit for appointment in the Government service, the grounds for rejection may be communicated to the candidates in broad terms without giving minute details regarding the defects pointed out by the Medical Board.

In cases where a medical board considers that minor disability disqualifying a candidate for Government service can be cured by treatment (medical or surgical) a statement to that effect should be recorded by the Medical Board. There is no objection to a candidate being informed of the Board's opinion to this effect by the appointing authority and

when a cure has been effected it will be open to the authority concerned to ask for another Medical Board.

(a) Candidate's statement and declaration.

The candidate must make the statement required below prior to his Medical Examination and must sign the Declaration appended thereto. His attention is specially directed to the warning contained in the Note below:—

1. State your name in full (in block letters)

2. State your age and birth place

2. (a). Do you belong to races such as Gorkhas, Garwallis, Assamese, Naga lands Tribals etc. whose average height is distinctly lower? Answer 'Yes' or 'No' and if the answer is 'Yes', state the name of the race.

3. (a) Have you ever had smallpox, intermittent or any other fever, enlargement or suppuration of glands, spitting of blood, asthma, heart disease, lung disease, fainting attacks, rheumatism, appendicitis?

OR

(b) any other disease or accident requiring confinement to bed and medical or surgical treatment?

4. When were you last vaccinated?

5. Have you or any of your near relations been afflicted with consumption, scrofula, gout, asthma, fits, epilepsy, or insanity?

6. Have you suffered from any form of nervousness due to over-work or any other cause?

7. Furnish the following particulars concerning your family:—

Father's age if living and state of health	Father's age at death and cause of death	No. of brothers living their ages and state of health	No. of brothers dead, their ages at and cause of death

Mother's age if living and state of health	Mother's age at death and cause of death	No. of sisters living, their ages and state of health	No. of sisters dead, their ages and at cause of death

8. Have you been examined by a Medical Board before?

9. If answer to the above is yes, please, state what Service/ Services you were examined for?

10. Who was the examining authority?

11. When and where was the Medical Board held?

12. Result of the Medical Boards examination if communicated to you or if known ?

I declare all the above answers to be, to the best of my belief, true and correct.

Candidate's Signature.....

Signed in my presence.....

Signature of Chairman of the Board.....

NOTE.—The candidate will be held responsible for the accuracy of the above statement. By wilfully suppressing any information he will incur the risk of losing the appointment and, if appointed, of forfeiting all claims to Superannuation Allowance or Gratuity.

(b) Report of the Medical Board on (name of candidate) physical examination.

1. General Development : Good.....
Fair.....Poor.....
Nutrition : Thin.....Average.....
.....Obese
Height (without shoes).....
Weight..... Best Weight.....
When ?..... Any recent change
in Weight ?.....
Temperature.....
.....

Girth of Chest :—

(1) (After full inspiration)
(2) (After full expiration)

2. Skin: Any obvious disease.

3. Eyes :

(1) Any disease
(2) Night blindness
(3) Defect in colour vision
(4) Field of vision
(5) Visual Acuity
(6) Fundus Examination

Acuity of vision	Naked eye	With glasses	Strength of glasses	
			Sph.	Cyl. Axis
Distant vision R.E. L.E.				
Near vision R.E. L.E.				
Hypermetropia R.E. (Manifest) L.E.				

4. Ears : Inspection..... Hearing :
Right Ear..... Left Ear.....

5. Glands..... Thyroid.....

6. Condition of teeth

7. Respiratory System : Does physical examination reveal anything abnormal in the respiratory organs ?

If yes, explain fully.....

8. Circulatory System:

(a) Heart : Any organic lesions ?.....
Rate : Standing
After hopping 25 times
2 minutes after hopping

Blood pressure : Systolic.....
Diastolic.....

9. Abdomen Girth Tenderness.....
..... Hernia.....

(a) Palpable : Liver.....
Spleen..... Kidneys.....
Tumours.....

(b) Haemorrhoids..... Fistula.....

10. Nervous System : Indications of nervous or mental disabilities.

11. Loco-Motor System : Any abnormality

12. Genito Urinary System : Any evidence of Hydrocele, Varicocele etc. ;

Urine Analysis :

(a) Physical appearance.....(b) Sp.

Gr..... (c) Albumen.....

(d) Sugar..... (e) Casts.....

(f) Cells.....

13. Report of X-ray Examination of Chest.

14 Is there anything in the health of the candidate likely to render him unfit for the efficient discharge of his duties in the service for which he is a candidate ?

15 For which services has the candidate been examined and found in all respects qualified for the efficient and continuous discharge of his duties and for which of them is he considered unfit ?

President.....

Member.....

Date.....

Place.....

APPENDIX III

CONDITIONS OF APPRENTICESHIP FOR SPECIAL CLASS APPRENTICES SELECTED THROUGH THIS EXAMINATION

The terms and conditions of Apprenticeship will be as set out in the form of agreement prescribed in the Indian Railway Establishment manual, brief particulars of which are given below :—

1. A candidate selected for appointment as a Special Class Apprentice shall execute an agreement, binding himself and one surety jointly and severally to refund in the event of his failing to complete training to the satisfaction of the Central Government any moneys paid to him consequent on his appointment as Apprentice.

The apprentices will be liable to undergo practical and theoretical training for 4 years in the first instance under an indenture binding them to serve on the Indian Railways on the completion of their training if their services are required. The continuance of apprenticeship from year to year will depend on satisfactory reports being received from the authorities under whom the apprentices may be working. If at any time during his apprenticeship, any apprentice does not satisfy the superior authorities that he is making good progress, he will be liable to be discharged from the apprenticeship.

NOTE.—The Government of India may at their discretion alter or modify the periods and courses of training.

2. The practical and theoretical training referred to above will be given in a railway workshop for four years of their apprenticeship. Special Class Apprentices must pass within this period either Parts 1 and 2 of the Council of Engineering Institutions Examination (London) or Section 'A' and 'B' of the Associate Membership of Institution of Engineers (India) Examinations. The apprentices will be granted a stipend of Rs. 125 per mensem during the 1st & 2nd years and Rs. 175 per mensem during the 3rd and 4th years. During the apprenticeship the apprentices will be required to undergo training in four periods of one year each, six months in the shops followed by six months in the School and will be examined at the end of each session. If unsuccessful at any of these examinations they will, depending on their performance, be asked to sit for and pass in supplementary examination or reverted to the next lower batch or removed from apprenticeship.

NOTE.—Except as provided for in paragraph 4 below or in cases of discharge or dismissal due to insubordination.

intemperance or other misconduct or breach of agreement, a week's notice of discharge from apprenticeship will be given.

3. Before the completion of 4th year of training referred to in paragraph 2 above, the apprentices will be listed in order of merits on the results of the examination held and the reports on the apprentices received during the period of apprenticeship. Successful apprentices will be appointed on probation for 3 years in the Indian Railway Service of Mechanical Engineers.

NOTE.—An apprentice will be considered to have obtained the qualifying standard if he obtains a minimum of 50 per cent marks in the aggregate in all the examinations held during the 4 years of his training including the marks of the reports of the Principal, Indian Railways School of Mechanical and Electrical Engineering, Jamalpur and of the Deputy Chief Mechanical Engineer, provided that in each of the 4 years he has obtained a minimum of 45 per cent marks in the aggregate and a minimum of 40 per cent marks in any one subject.

4. Unsuccessful apprentices will be discharged from their apprenticeship, one month's notice of discharge being given along with the intimation that the apprentice has been unsuccessful.

5. During the 1st and 2nd years of probation they will be sent to one or more of the Indian Railways for undergoing training in accordance with the syllabus prescribed for the purpose as modified from time to time. The probationers may also be required to attend after working hours, a technical college or special lectures on Engineering subjects. They will be given an oral test at the end of each phase of training during these two years of training and at the end of the 2nd year, they will be given a written test to be conducted jointly by the Chief Mechanical Engineer and the Chief Operating Superintendent of the Railway to which they are posted, on the training received by the probationers during this period. The qualifying marks at this test will be 50 per cent.

6. During the probationary period, they will have to attend a prescribed course of training in the Railway Staff College, Baroda, and to qualify in the tests held in the College. The test in the College is compulsory and a second chance, in the event of failure, will not be given except in exceptional circumstances and provided the record of the officers is such as to justify such relaxation being made. Failure to pass the test may involve the termination of service, and in any case, the officers will not be confirmed till they pass the test, their period of training and/or probation being extended as necessary. Before the end of second year of probation, they will be required to undergo a departmental examination which will include Accounting and Estimating, General and Subsidiary Rules, Factories Act, Workmen's Compensation Act, ability to handle labour and general application to work or works on which each officer is engaged while on probation. They will be required to pass the departmental examination within the second year of the probationary period. Failure to pass the examination may result in termination of service, and will, in any case, involve stoppage of increments. In case, where the probationary period has to be extended for failing to pass any or all the departmental examinations within the stipulated period on their passing the departmental examination and being confirmed after expiry of extended period of probation, the drawal of the first and subsequent increments will be regulated by the Rules and orders in force from time to time. It must be noted that a second chance to pass any examination will, as a rule, not be given except under exceptional circumstances and only provided the other record of the candidate during the period of his training is such as to justify such relaxation being made.

7. The appointment and pay as a probationer will commence from (a) the date of completion of four years of apprenticeship or (b) the actual date of completion of training whichever is later. Service for increment will be subject to paragraph 6 above, count from the date of appointment as probationer.

NOTE 1.—The retention in service of the probationers and the grant of annual increments are subject to satisfactory reports on their work being received at the end of each year of probation.

NOTE 2.—Service as probationer may be terminated on 3 months' notice on either side.

8. Particulars as to pay and general conditions of service prescribed for officers in the Indian Railway Service of Mechanical Engineers will be found in Appendix IV.

APPENDIX IV

PARTICULARS REGARDING THE INDIAN RAILWAY SERVICE OF MECHANICAL ENGINEERS

1. The probationary officers will be on probation for a period of three years during which their services will be liable to termination on three months' notice on either side. They shall undergo practical training for the first two years. Those who are reported upon and considered to have completed successfully the two years' training will be given charge of a working post provided they pass departmental and other examinations as may be prescribed. It must be noted that a second chance to pass any examination will, as a rule, not be given except under exceptional circumstances and only provided the other record of the candidate during the period of his training is such as to justify such a relaxation being made. Failure to pass the examination may result in the termination of service and will, in any case, involve stoppage of increment. At the end of one year in a working post the officers will be required to pass a final examination both practical and theoretical and will, if successful, be confirmed provided they are considered otherwise fit for permanent appointment. In cases, where the probationary period is extended for any reason, on their passing the departmental examinations and being confirmed after expiry of the extended period of probation, the drawal of the first and subsequent increments will be regulated by rules and orders in force from time to time.

Probationers will also have to undergo training at the Railway Staff College, Baroda, in two phases, first during the period of their two years' training and again during the period when they hold working posts. The test in the college is compulsory and a second chance in the event of failure, will not be given except in exceptional circumstances and provided the record of the officers is such as to justify such relaxation being made. Failure to pass the test may involve the termination of services and in any case, the officers will not be confirmed till they pass the test, their period of training and/or probation being extended as necessary.

NOTE.—The period of training and the period of probation against a working post may be modified at the discretion of Government. If the period of training is extended in any case due to the training not having been completed satisfactorily, the total period of probation will be correspondingly extended.

2. Probationers should have already passed or should pass during the period of probation, an examination in Hindi in the Devanagari script of an approved standard. This examination may be the "PRAVEEN" Hindi Examination which is conducted by the Directorate of Education, Delhi, or one of the equivalent Examinations recognised by the Central Government.

No probationary officer can be confirmed or his pay in the time scale raised to Rs. 450.00 per month unless he fulfils this requirement; and failure to do so will involve liability to termination of service. No exception can be granted.

3. Any person appointed to the Indian Railway Service of Mechanical Engineers on the results of the Examination held in 1965 onwards shall, if so required, be liable to serve in any Defence Service or post connected with the Defence of India for a period of not less than four years including the period spent on training, if any :—

Provided that such a person—

- (a) shall not be required to serve as aforesaid after the expiry of ten years from the date of appointment as probationer;
- (b) shall not ordinarily be required to serve as aforesaid after attaining the age of forty years.

4. Officers of the Indian Railway Service of Mechanical Engineers recruited under these Regulations.

- (a) will be eligible to pensionary benefits; and

(b) shall subscribe to the State Railway Non-Contributory Provident Fund under the Rules of that Fund; as applicable to Railway Servants appointed on the date they join service.

5. Pay will commence from the date of joining service as a probationer. Service for increments will also count from the same date subject to paragraph 1 above. Particulars as to pay are contained in paragraph 9 of this Appendix.

6. Officers recruited under these regulations shall be eligible for leave in accordance with the rules for the time being in force applicable to officers of Indian Railways.

7. Officers will ordinarily be employed throughout their service on the Railway to which they may be posted on first appointment and will have no claim, as a matter of right, to transfer to some other Railway but the Government of India reserve the right to transfer such officers in the exigencies of service, to any other Railway or Project in or out of India. Officers will be liable to serve in the Stores Department of Indian Railways if and when called upon to do so.

8. The relative seniority of officers recruited on the results of the Special Class Railway Apprentices' Examination will ordinarily be determined by the order of merit at the end of their first four years training, while in the case of those recruited on the results of the Combined Engineering Services Examination, the relative seniority will ordinarily be determined by the order of merit in the competitive examination. As between the officers recruited through Special Class Railway Apprentices' Examination and those recruited through Combined Engineering Services Examination, seniority will be determined on the basis of entry in the time scale subject to *inter-se* seniority of each batch being maintained. The Government of India, however, reserve the right of fixing seniority at their discretion in individual cases. They also reserve the right of assigning to officers appointed otherwise than by the two examinations referred to above, positions in the seniority list at their discretion.

NOTE.—If the period of training and consequently the period of probation is extended in any particular case due to the training not having been completed satisfactorily, the officer concerned is liable to lose in seniority.

9. The following are the rates of pay at present admissible to officers appointed to Indian Railway Service of Mechanical Engineers.

Junior Scale : Rs. 400—400—450—30—600—35—670—EB—35—950 (authorised Scale).

Senior Scale : Rs. 700 (1st to 6th Year)—40—1,100—50/2—1,250 (authorised Scale).

Junior Administrative Grade : Rs. 1,300—60—1,600.

Senior Administrative Grade : Rs. 1,800—100—2,000—125—2,250.

NOTE 1.—Probationary officers will start on the minimum of the Junior Scale and will count their service for increments from the date of joining. They will, however, be required to pass any departmental examination or examinations that may be prescribed before their pay can be raised from Rs. 400.00 p.m. to Rs. 450.00 p.m. in the time scale.

NOTE 2.—Increment from Rs. 400.00 to Rs. 450.00 will be stopped if they fail to pass departmental examinations within the first two years of the training and probationary period. In cases where the training period has to be extended for failure to pass all the departmental examinations within the stipulated period, on their passing the departmental examinations after expiry of the extended period of training, their pay from the date following that on which the last examination ends, will be fixed at the stage in the time scale which they would have otherwise attained but no arrears of pay would be allowed to them. In such cases the date of future increments will not be affected.

NOTE 3.—Advance increments from Rs. 400 to Rs. 450 and from Rs. 450 to Rs. 480 in the junior scale of Rs. 400—950 may, however, be granted during the period of probation as soon as the probationary officer passes the prescribed examinations. After the grant of advance increments, the pay of the officer will be regulated according to his position in the time scale.

10. The increments will be given for approved service only and in accordance with the rules of the Department.

11. Promotions to the Administrative grades are dependent

on the occurrence of vacancies in the sanctioned establishment and are made wholly by selection; mere seniority does not confer any claim for such promotion.

MINISTRY OF HEALTH, FAMILY PLANNING, WORKS HOUSING AND URBAN DEVELOPMENT

(Department of Health)

RESOLUTION

New Delhi, the 8th October 1970

No. 23-7/70-ME(UG).—The Executive Committee of the Central Council of Health, at its meeting held on 9-4-1963, recommended a comprehensive examination of all aspects of Medical Education in the light of national needs and resources. The Central Council of Health, at its 15th meeting held in Bombay on 16th-17th October, 1968, decided that before the problems of Medical Education are posed on the forum of a Medical Education Conference, these should be studied by a Committee of Officials and Experts. Consequently, the Government of India, in the Ministry of Health, Family Planning, Works Housing and Urban Development (Department of Health), appointed a Committee headed by Shri B. P. Patel, Secretary of the Departments of Health and Family Planning. The terms of reference of the Committee were as follows :

1. To study all aspects of Medical Education and Training of Medical Graduates in the light of national needs and resources;

2. To consider the development of medical curriculum in relation to national requirements, the need for uniformity of syllabus, apportioning of time between didactic and practical teaching, selection of entrants to Medical Colleges, reciprocity between Medical Institutions and Universities and domiciliary restrictions in the matter of medical admission."

2. The Chairman of the Committee, Shri B. P. Patel, submitted the report in 1969 (a copy of the report is attached at Annexure-I). The Committee has documented relevant data. After analysing the data and examining the pros and cons of the various issues arising out of the terms of reference, the Committee has embodied its recommendations on 21 different aspects of the problem.

3. The Report of the Committee was unanimous. The soundness of its conclusions is reflected in the around support its recommendations have received. Government is pleased to place on record its appreciation of the valuable work done by the Committee.

4. This report of the Committee was placed for discussion before a Conference of Ministers, Vice-Chancellors of Universities, Principals, Deans of Medical Colleges, Experts in Medical Sciences and Administrators. This Conference was held in New Delhi on 6th and 7th of July, 1970. After careful consideration of the recommendations of the Medical Education Committee, the Conference adopted recommendations accepting and, at places, modifying or enlarging the recommendations of the Committee.

5. The recommendations of the Medical Education Committee as modified or enlarged by the Medical Education Conference were further considered by the Executive Committee of the Central Council of Health at its Sixth meeting held in Aurangabad on 23rd July, 1970. The Committee noted with satisfaction that the Medical Education Conference had welcomed and had endorsed the recommendations of the Medical Education Committee and felt that the modifications and supplementary recommendations made by the Conference be accepted.

6. In consonance with this endorsement of the Executive Committee of the Central Council of Health, the Government of India have examined with care the recommendations of the Medical Education Committee as modified or enlarged by the Medical Education Conference and have decided to accept all the recommendations as at Annexure II.

7. As regards the recommendation not to revive the Licentiate Course, the Government of India while accepting the recommendation are of the view that the effect of this recommendation should be watched closely and the situation reviewed after a few years.

8. As regards the recommendation relating to the duration of the MBBS course including internship, it has been decided that six months out of the total internship period of one year should be spent in the rural areas.

9. As regards the recommendation relating to capitation fees, the Government of India will examine the economics of the private Medical Colleges charging such capitation fees for being taken over by the State or Central Government or for providing financial assistance for this purpose.

ORDER

ORDERED that a copy of the "Resolution" be communicated to :

- (i) all State Governments.
- (ii) all Union Territory Administrations.
- (iii) Vice-Chancellors of Universities having medical faculties.
- (iv) Deans and Principals of all medical colleges in the country.
- (v) all Directors of Medical Education.
- (vi) Ministry of Education and Youth Services.
- (vii) Ministry of Defence.
- (viii) Director-General of Health Services, New Delhi.
- (ix) President, Medical Council of India, New Delhi.

ORDERED also that the "Resolution" be published in the Gazette of India for general information.

PREMA JOHARI, Jt. Secy.

REPORT ON MEDICAL EDUCATION COMMITTEE, 1969

Committee to Examine the Question of Under-Graduate Medical Education in the Light of National Needs and Resources

CHAPTER I

INTRODUCTION

After the commencement of the First Five Year Plan, Medical Education in the country received an unprecedented impetus. The number of medical colleges which stood at 30 in the year 1950-51 increased to 87 at the end of the Third Plan. The total number of colleges at present is 93. In the Fourth Five Year Plan, 10 more medical colleges are proposed to be started. During this period the admission capacity of the medical colleges has increased nearly 5 times from an intake of about 25000 in 1950-51 to about 12,000 in the year 1968-69 with an annual turn-out of about 8700 graduates. After the establishment of 10 medical colleges in the Fourth Five Year Plan, an additional admission capacity of 1500 will be created.

2. The Health Survey Planning Committee (Mudaliar Committee) has recommended that the health plan should be drawn up keeping in view the objective of providing one doctor for a population of 3500. It has been estimated that the doctor-population ratio in our country at the end of the Third Five Plan was 1 : 5800. There was some improvement in the subsequent years and the doctor-population ratio in the year 1968 was estimated at 1 : 5112. There is not only a lack of qualified Physicians in India in relation to its vast population but the distribution of doctors over the different States is extremely uneven and when the distribution is looked at as between rural and urban population the problem seems to be that while 80% of Indian people live in villages and only 20% in urban areas, the distribution of qualified doctors is just the reverse of the distribution of population between the two sectors.

3. The progress in regard to the expansion of medical care facilities in the rural area has lagged much behind the objectives contemplated by the Bhore Committee and the Mudaliar Committee. Of the 4998 Community Development Blocks (each with an approximate population of 80,000 to 100,000) 371 blocks were without a Primary Health Centre and of the other 327 were without a doctor. 5196, the original number of blocks, have been taken for the purpose of the establishment of Primary Health Centres in India. According to this 506 additional Primary Health Centres are to be established. Doctors are not available for Primary Health Centres.

Even if the doctors are posted there, they remain on the look out for transfer to cities. The reasons for this state of affairs are the difficult conditions of living, lack of accommodation and basic facilities such as communications, children's education and poor working conditions.

4. The present admission capacity of the postgraduate departments (both in degree and diploma course) attached to the various medical colleges/institutes in the country is about 6000. Against this the annual intake of about 3500 are being actually utilized. With the proposed new departments to be started for the Fourth Five Year Plan a further increase of admission capacity of about 1600 is contemplated.

4. (a) A basic doctor, a general practitioner is a doctor who does not limit his work to certain groups of illnesses or age groups. The doctor takes the responsibility to give and coordinate coherent prophylactic and curative medical care. To such a practitioner the patient is a human being and not a case, a number or a medical problem. He is the one who must be engaged in the needs and the problems of the individual patient as a person in his or her particular surrounding. Above all he should be social and temperamentally suited to function as a guide and friend to the community he practices in. In the modern complicated society he is indispensable and his role today is more important than ever in a medical world of increasing differentiation and specialisation. In spite of all this, the current trend in India is more and more towards specialisation. This is because of the policy being followed of giving inducements to persons with post-graduate qualifications not only in terms of employment, placement in better stations, but also of a higher social status in the profession. The ever increasing number of seats for post-graduate training maintained at the cost of the Government and grant of stipends from the tax payer's money further acts as a deterrent to a new medical graduate to establish as General Practitioner either in private practice in the rural area or in Government service. Furthermore, the inability of the Government to provide satisfactory working conditions, lack of diagnostic facilities poor living conditions does not give job satisfaction to a practitioner in rural area.

5. In the past 20 years the five fold increase in the number of students has not solved the problem. The present system of medical education has had no real impact on the medical care of the vast majority of the population of India who live in rural and semi-rural areas. Even in the most highly developed countries there is dis-satisfaction with the current curricula for under-graduate teaching. That traditional under-graduate medical education curriculum is unsatisfactory, is widely recognised. A question being asked repeatedly is "Does it meet all the needs and interests of the community?" The application of behavioural sciences (psychology, sociology and related disciplines) to medical care is widely recognised. An essential part of a medical student's education ought to be how to treat ailing human beings to gain their confidence and to understand the psychological and social backgrounds to the physical problem.

6. Even in the rich countries it is acknowledged that the distribution and delivery of the quality of medical care of which we are not capable, leaves much to be desired. The educational system leading to the development of health personnel, needs to be examined in the context of the needs of our country. It is a grave error to copy the traditional type of medical education of the developed countries which have made considerable strides in medical technology and the pattern of diseases in those countries is changing. Their problems are totally different as not only the diseases are different but also the amount of resources for dealing with them. Solution to these problems adopted in well developed countries are often not applicable and may be even undesirable in the vast subcontinent of India.

7. A physician has to learn the broad concept of the genesis of the disease especially prevalent in the region and the country so that as a leader of the health team he can guide his colleagues towards the implementation of preventive measures. He has to develop a diagnostic sense which is not dependent on elaborate laboratory tests because all too often laboratories will not be available to him. He will have to rely almost entirely on clinical methods and also learn to use therapeutic tests to confirm diagnosis whenever necessary. 90% of the illnesses can be dealt in this way. The other 10% cannot at present be dealt with in this way. To meet these needs the physician must be trained in an environment as close as possible to that in which he is eventually going to work.

Furthermore, the effectiveness of a physician could be greatly extended by the application of relatively simple and inexpensive means atleast in comparison with the cost of training of a doctor, involving the application of medical technology.

8. A question which is agitating the minds of medical administrators, educators and others is why there is shortage of medical practitioners in the rural areas. There is a genuine feeling that the undergraduate medical education adopted in our country is 'urban oriented' and the Medical Council of India is not able to guide the under-graduate medical education fitted to feed the rural service. The approach and the content of medical education so far has been towards the curative service and specialization. In his training at the medical colleges of today, the physician is not being trained to meet the tasks of environmental health, preventive medicine and handling of day-to-day ailments prevalent in the community. The environments of rural India are quite different to those existing in the urban areas and the product of the present day medical education is, therefore, not the physician fitted for the service of a family doctor. To meet the needs what is required is a complete change of the mould so that the model brought out is suited to the rural requirements.

9. The third conference of the Deans and the Principals of the Medical Colleges held in New Delhi in August, 1967 made certain recommendations. These were considered by the Executive Committee of the Central Council of Health at its 3rd Meeting held on the 19th April, 1968 which recommended that there was a need to study all aspects of medical education in the light of national needs and resources. It directed that a Ministerial Committee should be appointed to consider the question of medical education in all aspects and that this Committee should before formulating recommendations elicit opinions from Vice Chancellors of Universities, prominent medical educationists and representatives of State Governments. While noting these recommendations, the Central Council of Health at its 15th meeting held at Bombay on 16th and 17th October, 1968 decided that before the problem of medical education is put up for the main conference, a study of all aspects of medical education for training medical graduates be made by officials and experts.

CHAPTER II

COMMITTEE'S APPOINTMENT, TERMS OF REFERENCE, PROCEDURE ETC.

Appointment and terms of Reference

10. The Government of India in the Ministry of Health, Family Planning, Works Housing and Urban Development appointed a Committee* with the following terms of reference :

- (i) To study all aspects of medical education and training of medical graduates in the light of national needs and resources;
- (ii) to consider the development of the medical curriculum in relation to national requirements, the need for uniformity of syllabus, apportioning of time between didactic and practical teaching, selection of entrants to medical colleges, reciprocity, between various medical institutions and Universities and domiciliary restrictions in the matter of medical admission.

The Committee will submit its report by the end of December, 1968 at the latest. This period was subsequently extended to the end of June, 1969.

Composition

The Committee consisted of the following :

1. Secretary,
Ministry of Health, Family Planning and Urban Development. *Chairman*

Members

2. Shri M. G. Pimputkar,
Additional Secretary,
Ministry of Health, Family Planning and Urban Development.
3. Dr. P. K. Duraiswami,
Director General of Health Services.
4. Dr. D. V. Virkar,
Surgeon General to the Govt. of Maharashtra,
Bombay.

5. Dr. K. C. Sarabadhikari,
Director of Health Services,
West Bengal, Calcutta.
6. Shri Ananta Padmanabhan,
Secretary, Health & Family Planning,
Govt. of Madras.
7. Dr. Moti Singh,
Director of Health Services,
Punjab, Chandigarh.
8. Dr. A. C. Joshi,
Vice Chancellor,
Banaras Hindu University, Varanasi
9. Dr. N. Thangavelu,
Dean, Medical College,
Trivandrum.
10. Dr. K. L. Wig,
Director, All India Institute of Medical Sciences,
New Delhi.
11. Dr. Jacob Chandy,
Principal,
Christian Medical College,
Vellore.
12. Dr. Y. M. Bhende,
Dean, B. J. Medical College,
Poona.
13. Dr. S. Govindarajan,
Ex-Director, Indian Association for Advancement of
Medical Education, Madras.
14. Dr. C. B. Singh,
1, Kamla Nagar,
Kanpur-12 (U.P.)
15. Dr. Tulsi Das,
Officiating President,
Medical Council of India,
207 Sector 16, Chandigarh.
16. Dr. P. J. Phillip,
Secretary, University Grants Commission,
New Delhi.
17. Dr. (Mrs.) S. Achaya, *Member Secretary*
Deputy Director General (Medical)
Directorate General of Health Services,
New Delhi.
18. Dr. D. Bhatia,
Commissioner (Family Planning),
Ministry of Health, F.P. W.H. & U.D.,
New Delhi.

Procedure.

12. The deliberations of the Committee were spread over three meetings held on November 11, 1968, December 17, 1968 and January 29, 1969. In addition the sub-groups of the Committee also held meetings in November and December, 1968.

13. The first meeting of the Committee on 11th November, 1968 was held under the Chairmanship of Shri Govind Narain, the then Secretary, Ministry of Health, Family Planning and Urban Development. The Chairman said that it was a general feeling that something was wrong with our medical education and that many subjects and basic elements were not given due importance. The Union Public Service Commission had recently pointed out that medical graduates, and those with post-graduate qualifications who came up for interview, did not know the basic facts and this called for assessment, review and rectification. Difficulties were caused by the imposition of domiciliary restrictions, and participation of members of Scheduled Castes/Scheduled Tribes in medical education and services was inadequate. A further issue for consideration of the system of medical education; whether to adopt the system in vogue in better developed countries or to evolve one which would be more suited to the health services in our country.

14. In taking stock of the existing situation the Committee noted that expansion of medical colleges had tended to lower the quality of education. This naturally raised the issue of the expansion programme in the Fourth Five Year Plan. The duration and content of the medical course was also a factor

*Vide letter No. 23-3/68-ME(UG) dt. 29-10-68 Annex. IA)
No. 23-3/68-ME(UG) dt. 28-11-68 (Annex. IB)
No. 23-3/68-ME(UG) dt. 11-4-69 (Annex. IC)

for critical appraisal and assessment. Has the introduction of preventive and social medicine in the curriculum made an impact on the medical graduate, changed this outlook and helped to produce a basic doctor? Another important aspect of medical education was the relationship of medical colleges to the universities and the location of pre-medical education in a medical college or in a science college. Opinion was expressed that there was room for modification in the present system of examination and its replacement by a semester system and internal assessment. In spite of a large number of medical graduates being turned out the position of doctors in the rural areas had not materially changed; on the other hand, the brain-drain of doctors had continued.

15. To assess and evaluate the large number of problems related to medical education the Committee decided to split up into three sub-groups to discuss and make recommendations on specific problems within four weeks. The sub-group were :—

(1) *Sub-group I.* to consider entrance requirements, methods of selection of students, domicile restrictions, matters related to admission of Scheduled Castes candidates and pre-medical education.

Shri M. G. Pimpitkar
Shri A. C. Joshi
Dr. Tulsi Das
Dr. Jacob Chandoy
Dr. Moti Singh

Convenor

(2) *Sub-group II* to consider pre-clinical and para-clinical courses.

Dr. S. Achaya
Dr. K. C. Sarabdhikari
Dr. M. Govindarajan
Dr. Y. M. Bhende
Dr. M. Thangavelu

Convenor

(3) *Sub-group III* to consider clinical courses and internship.

Dr. P. K. Duraiswami
Shri Ananta Padmanabhan
Dr. C. B. Singh
Dr. K. L. Wig
Dr. D. V. Virkar

Convenor

16. The Second and Third Meeting of the Medical Education Committee were held on Tuesday, the 17th December, 1968 and 29th January, 1969 under the chairmanship of Shri B. P. Patel, Secretary, Union Ministry of Health, Family Planning and Urban development. Besides consideration of the reports* of the sub-groups the curricula for subjects of M.B., B.S., course, the question of having a licentiate course of medicine, the aggregate period of education before entrance to the M.B., B.S., course, the duration of that course and the period of internship were some of the important aspects of Medical Education taken up for consideration by the Committee.

CHAPTER III

Outline of Conclusions and Recommendations.

Is there a need for diploma for licentiate course in Medicine?

17. The protagonists for re-introduction of the licentiate course put forward the argument that in the rural areas 70-80% of illnesses were being dealt with by unqualified persons and that maternal and child health services so essential in these areas were not available. This, it was stated was due to the reluctance of graduate doctors to practise in these areas. A three year course with emphasis on maternal and child care, paediatrics and prevention of communicable disease leading to a diploma, it was argued, may be the answer to paucity of medical aid in rural areas. A country like Britain with a fully developed economy could afford to decide that a graduate doctor was not fully qualified to practise, but becomes so after post-graduate training; but other countries like the U.S.S.R., China and the African countries had recognised the need for utilising the services of medical attendants. In India out of about a lakh doctors borne on medical lists of different medical councils, about 80,000 were effective. The planned increase in the number of medical graduates in the next five years would be neutralised with the increase in population. The doctor population ratio was therefore not expected to improve. Reintroduction of the licentiate course was, it was stated necessary to bridge this widening gap.

*Annex. III, IV & V.

18. The majority of the members of the Committee, however, did not favour the introduction of a diploma course in medicine. Two levels of doctors would introduce casteism in medical education. The present uneven distribution of duties between rural and urban areas would not be corrected as the diploma holders would either practise in urban areas, or clamour to gain admission to condensed courses to qualify for the degree course. To encourage deployment of medical men in rural areas the following measures may be adopted :

- (i) while the medical officers should not be allowed private practice, they should be given adequate non-practising plus rural allowances;
- (ii) adequate facilities for residential accommodation should be provided and transport made available;
- (iii) all medical officers in the cadre should be posted to rural assignments by rotation;
- (iv) service in rural area should be an essential pre-requisite for confirmation in Government service and in crossing the efficiency bar;
- (v) other things being equal, preference should be given for post-graduate training to those who have to their credit service in the rural areas;
- (vi) posting to rural areas should normally take place only after one or two year's service in a hospital or in other posts under the supervision of another medical officer.

The Committee did not favour the reintroduction of the diploma or licentiate course in medicine.

Entrance requirements

19. The Committee noted that while in some states the entrance qualification for the medical course was 11 years of schooling, 1 year of pre-university, and 1 year of pre-medical course, in others the requirements were 2 years of study after matriculation (10) years, and one year after higher secondary (11 years). Other patterns were the Intermediate examination with physics, chemistry and biology, or the pre-degree examination in science or pre-university and the 1st year of the B.Sc., course. These widely varying patterns may be responsible for varying standards of medical education in medical colleges in the country. After examining the pros and cons of these varying patterns, the committee came to the conclusion that for entrants to the M.B.B.S. course, a 13 years academic study was considered desirable. This may be :

- (a) 11 years of schooling and 2 years of pre-medical studies; or
- (b) 12 years of schooling and 1 year of pre-medical training; or
- (c) in states with 10 years of schooling, three more years of preparation for vocational training;

till a more acceptable and uniform formula was evolved.

Should the pre-medical course be conducted in science colleges affiliated to the Universities or in the medical colleges?

20. There was considerable discussion as to where the pre-medical course should be conducted. The argument in favour of locating the pre-medical course in science colleges affiliated to different universities was that multifaculty facilities exist. Students would benefit because of instructions being imparted by senior teachers, of universities. The liberal academic, cultural and social atmosphere of the university would also widen their outlook. In organising the pre-medical course in the medical college the expenditure in buildings, equipment and manpower would be prohibitive. Further for candidates who were unable to secure admission to medical colleges, their attachment to science colleges would afford to them the facilities to continue their academic life for various other degree courses in the colleges of the University.

21. The point in favour of pre-medical education being conducted in the medical colleges was that most of the universities in India with the exception of Banaras, Aligarh and Annamalai, were of a federal character with a large number of affiliated science colleges in which junior teachers were assigned for pre-medical courses, while senior teachers were engaged in post-graduate training and research. The affiliated colleges were often located away from the University campus and lacked the liberalising atmosphere. An added advantage was that the selection for medical studies at the beginning of the pre-medical course would eliminate the

wastage of students who having passed the pre-medical examination, fail to get admission to medical colleges. It would be better to orient the student to medical studies in an atmosphere of a medical college and a hospital.

22. Giving due weight to the considerations stated above the committee is of the view that the policy in regard to the location of pre-medical study may be kept flexible. The pre-medical course may be conducted ordinarily in science colleges affiliated to different universities. Nevertheless, medical colleges which can afford the high level of expense and organisation should also be permitted to conduct pre-medical course, after being examined by the state concerned the incidence of this alternative on the public purse. Similarly, not every science college affiliated to a university should be permitted to conduct a pre-medical course. The university to which the medical college is affiliated may select the science colleges considered suitable for pre-medical studies, criteria for suitability being a pre-medical curriculum oriented to medical sciences, sufficiently of well qualified staff, well equipped laboratories and adequate library facilities, in either case the institutions conducting pre-medical courses should provide facilities to candidates who pass the pre-medical examination but fail to get admission into medical colleges, to continue their study in the same science college to complete the B.Sc. course.

23. It was generally agreed that the pre-medical course should comprise the study of physics, chemistry, biology, basic mathematics in relation to physics, and an introduction to statistics and language and literature as recommended by the Mudaliar Committee (1968). As social sciences were important as a basis for study of preventive and social medicine introduction in this discipline should commence during the pre-medical course. The recommendation of the Mudaliar Committee to lengthen the duration of pre-medical course lasting eighteen months in view of the introduction of additional subjects was not accepted.

The Committee suggested that the choice of contents should be so made as to compress them for completion of instruction in one academic year. The curriculum for the pre-medical course should be drawn up by the Faculty of Science in consultation with the Faculty of Medical Sciences.

Methods of selection of students

24. It was observed that in each state there are more than one university/examining body for conducting examinations, and that standards of pass percentage and marking vary. Accepting the percentage of marks obtained at these qualifying examinations as the basis of admission introduces an element of disparity. In the absence of any device to eliminate these varying disparities the Committee is of the opinion that entrance examination may be resorted to in cases of admission to medical colleges, admitting candidates on an all-India basis.

25. For admission to medical colleges at state level however, the number of universities would not be large nor the disparities in marking by different universities so great as to warrant a special examination. It should also be possible to devise practical measures to discount disparities in order to arrive at reasonable and equitable yardstick for fixing the order of merit in admission. The entrance examination it was felt, would be an intolerable burden on students who may apply for more than one medical college. It was also recognised that for a hundred or so seats the number of applications run into many hundreds. An extensive interview system would be physically impossible. Any such *ad hoc* test would eliminate altogether the relative proficiency of candidates in conducting practicals and laboratory practice.

particular persons much easier under this system. would be greater and the avenues for bias in favour of particular persons much easier under this system.

26. In States, where the standards of making passes by different universities for the qualifying examination vary so materially as to warrant notice, a corrective could be applied by appointing examiners largely from outside the university. Secondly, besides the marks obtained in the qualifying examination to the admission for the M.B., B.S. course, the marks obtained by the candidates in the higher secondary or similar other examinations may also be considered. This is suggested as the higher secondary examination is a state Board examination for the State as a whole and the candidates undergo uniformity of marking at this level.

These and similar other measures could be designed to suit the requirements of a particular case with a view to approximate as far as possible to a reasonable, equitable and uniform yardstick for admissions.

Medium of instruction

27. There was unanimity of opinion, amongst the members that for the present the medium of instruction in medical colleges should continue to be English.

Domicile restrictions

28. The Committee was of the opinion that domicile restrictions were undesirable in the larger interests of intellectual attainment and national unity. In case it was not possible immediately to waive domicile restrictions, the Committee recommended that to begin with 5% of seats in medical colleges may be reserved for candidates from other states, and this quota should be increased gradually to 10%.

Capitation fee

29. It was observed that charging of capitation fees by some private medical colleges tended to lower the standards of education. Candidates with lower percentage of marks generally secure admission in such colleges. The system of charging of capitation fees by medical colleges needs to be discouraged wherever Government support could be made available to make good the gap in the revenues of the colleges created by loss of capitation fees.

Admission of candidates belonging to Scheduled Castes and Tribes

30. The Committee was of the opinion that reservation of seats for members of Scheduled Castes/Scheduled Tribes may continue but the difference between the marks obtained in the qualifying examination for entrance to a medical college, by this category of students, and those prescribed for other students, may not be large. The Committee recommended that candidates from Scheduled Castes and Tribes seeking admission to medical colleges should be considered eligible if they obtained 5% of marks less than that prescribed as minimum requirements for other candidates.

M.B., B.S. course

31. The Committee was of the opinion that the total period of the undergraduate medical course should be 4½ years and one year of internship. Of this 18 months would be devoted to instruction in pre-clinical subjects, and 36 months to para-clinical and clinical subjects. Internship should include posting in a rural centre for a period of at least 3 months under adequate supervision. The aim is that the medical teaching and training would be oriented to produce a doctor conversant with the basic health problems of rural and urban communities and can practise scientific methods.

Basic doctor

32. A basic doctor is one who is well conversant with the day-to-day health problems of the rural and urban communities and who is able to play an effective role in the curative and preventive aspects of the regional and the national health problems. Besides being fully well-up in clinical methods i.e. history taking, physical examination, diagnosis and treatment of common conditions, he should have the competence to judge which cases require to be referred to a hospital or a specialist. He should be able to give immediate life-saving aid in all acute emergencies. He should be capable of constant advancement in his knowledge by learning things for himself by having imbibed the proper spirit and having learned the proper techniques for this purpose during his medical course. For this purpose, a good library is essential and an under-graduate should be encouraged to make the best use of it.

CHAPTER IV

SUGGESTIONS FOR CURRICULUM PLANNING

33. The content of this curriculum should be designed with the aim of producing a basic doctor. As all the medical colleges have not only to produce basic doctors but also future specialists, teachers and research workers from the same batches, it is essential that adequate knowledge be imparted to the student in basic medical sciences to enable him to acquire further knowledge after qualifying as a doctor. This would further ensure understanding of what modern medical sciences and clinical practice are based on. Such

knowledge would be of great advantage even to the basic doctors, for, from amongst them also many will progress to specialisation and scientific research. The age at which the student reaches the clinical stage is far too premature for him to take a decision and choose whether he wants to be a basic doctor or a scientific worker. It will also not be fair to him if someone else is authorised to take a decision on his behalf to earmark him for specialisation, scientific research, or general practitioner as a basic doctor.

A. Pre-clinical courses

34. It was generally agreed that a period of 18 academic months is required for instruction in anatomy, physiology, bio-chemistry and introduction to preventive and social medicine providing for an over-all 1700 hours of period of instructions.

35. *Anatomy*.—Of this 1700 hours pre-clinical teaching, not less than 700 hours may be allocated for instruction in anatomy including histology, embryology and principles of human genetics. It was not necessary to dissect the entire human body or to include instruction in physical anthropology.

At least one period a month should be a joint teaching-cum-demonstration session with clinical material illustrating applied aspects of anatomy in relation to surgery, paediatrics, medicine, obstetrics and gynaecology.

Didactic teaching should be reduced and seminar and group discussions under adequate supervision be encouraged.

36. *Physiology including bio-physics*.—About 550 teaching hours may be allocated for teaching of physiology. During this period the principles of bio-physics may also be enunciated and demonstrated.

During the period of instructions in physiology, and bio-physics at least one period a month should be a joint teaching-cum-demonstration session with clinical material illustrating the applied aspects of physiology in relation to medicine, surgery, psychiatry and paediatrics.

37. *Bio-chemistry*.—The purpose of teaching bio-chemistry in the pre-clinical years should be to enable the prospective physician to comprehend the bio-chemical basis of life and the deviation in common disorders. The student should handle biochemical samples. He should be instructed how to collect such samples for laboratory investigations. He should be able to appreciate the results of analysis, as found in healthy individual, and in common disorders of function. It would, therefore, be necessary for the teacher of bio-chemistry to demonstrate to the students in collaboration with clinicians, suitable clinical cases.

The doctor attached to a primary health centre or peripheral hospital, and a general practitioner, particularly in the rural area, does not have the facilities provided by referral laboratories. It is, therefore, desirable that he should be able to perform simple bio-chemical investigation. For this adequate practical training during the pre-clinical course must be ensured.

About 350 hours may be allocated to the teaching of bio-chemistry, didactic lectures should be reduced, and seminars and group discussions encouraged.

38. *Family Planning*.—During the pre-clinical course the departments of anatomy, physiology, bio-chemistry and preventive and social medicines may, organise individual and joint teaching sessions for instruction in the principles of family planning.

39. *Preventive and social medicine*.—To serve as a background for the teaching of preventive and social medicine, social sciences should be included in the pre-medical curriculum.

About 60 teaching hours may be allocated during the pre-clinical course for the teaching of preventive and social medicine. The curriculum for this period should include bio-statistics, ecology of disease, demography, growth and development, nutrition, medical economics, sociology and medical ethics.

The teaching of social and preventive medicine should form an integral part of the MBBS degree. Marks obtained by students in this discipline should be ranked with those in other discipline for award of the MBBS degree. Teachers of preventive and social medicine should preferably have clinical experience. During this period it may benefit the student in his understanding of the health problems in communities, if

participation of general practitioners in seminars and group discussions may be organised.

About 340 hours should be made available for instruction in social and preventive medicine during the 3-year of para-clinical and clinical courses.

40. Examinations in pre-clinical subjects and of the curriculum covered in preventive and social medicine during pre-clinical course. Examinations should be of the semester type and should be held twice during the 18 months period of pre-clinical training in the discipline of anatomy, physiology and bio-chemistry, and once in the discipline of preventive and social medicine.

25% of the total marks allocated for the university examination should be earmarked for internal assessment.

The written papers for each semester examination should be one each (i) anatomy (ii) physiology and bio-chemistry combined and (iii) preventive and social medicine at the end of 18 months. The practical examinations for each subject may be conducted separately. The oral examinations may be conducted jointly by a board of examiners in the subjects of anatomy, physiology and bio-chemistry, and in the second semester examination the examiner in preventive and social medicine should be a member of the board of examiners.

B. Para-clinical courses

41. It was considered necessary to reorganise the courses of study and examinations in the para-clinical subjects of pharmacology, pathology and microbiology. The study of para clinical subjects may cover a period of two years after completion of the pre-clinical course. During the first year instruction and examination in pharmacology, general pathology and microbiology and parasitology and immunology would be undertaken, and in the second year, instruction and examinations be undertaken in special pathology and forensic medicine. Paediatrics and forensic medicine may be taught during this period and the teaching and examination on ophthalmology may or may not be included within this period. Paediatrics, and ophthalmology are referred to later under clinical subjects.

42. *Pharmacology*.—It was agreed that the course, in pharmacology, general pathology and microbiology should be completed in the first year of the clinical period. About 285 teaching hours may be allocated to the teaching of pharmacology and toxicology.

Instruction in pharmacy and pharmacognosy should be greatly reduced and experimental pharmacology be introduced.

A close liaison between the departments of pharmacology and the department of medicine must be maintained for teaching and training, by seminars and group discussions in which clinical teachers participate.

The University examinations in pharmacology may be held 12 months after the last university examination in pre-clinical subjects. Questions may be of the objective or multiple choice type. The clinical teachers in medicine should be associated with the oral examinations.

43. General Pathology, Clinical Pathology, Microbiology and Parasitology and Immunology.

It was agreed that the teaching of general pathology may be done concurrently with microbiology and parasitology, but special pathology should be taught with clinical subjects.

The departments of pathology and microbiology should be independent departments.

Because of its widespread prevalence in the country, parasitology is an important aspect for instruction of the undergraduate medical student. The epidemiological concepts, national programmes for control, and preventive aspects including the significance of life cycles should be taught by the department of preventive and social medicine, and the clinical manifestations of infestation, and investigative techniques by the department of microbiology.

About 245 hours should be allocated for instruction in general pathology, microbiology parasitology and immunology.

There should be close liaison between the departments of pathology, microbiology, preventive and the clinical departments.

Didactic lectures should be reduced and seminars and group discussions with the participation of clinical teachers should be the chief method of instruction.

During the course of instruction in chemical pathology the collaboration of the staff of the deptt. of bio-chemistry should be sought.

The examination in general pathology and microbiology should be held at the end of the first clinical year. The paper of the objective or multiple choice type must cover both subjects, and the oral examination must be conducted jointly by the heads of departments of pathology, microbiology, preventive and social medicine and internal medicine.

44. *Special pathology.*—The teaching of special pathology must be closely linked with teaching of clinical subjects.

About 215 teaching hours should be allocated to the teaching of special pathology.

Didactic teaching should be reduced and seminars, group discussions and clinico-pathological conferences with participation of clinical teachers should be organised.

The university examination in special pathology should be held at the end of the third clinical year.

Questions in theory may be of the objective or multiple choice type.

The conduct of the oral examination must be done jointly with teachers in the clinical departments of internal medicine, surgery, obstetrics and gynaecology.

45. *Forensic Medicine.*—It must be realised that very often a medical graduate posted in district towns and taluk hospitals may be called upon to conduct medico-legal post-mortems and to give his opinion in medico-legal cases. The training in forensic medicine as at present conducted is inadequate to meet this need.

A department of forensic medicine must be an independent one with full-time staff, and a professor as Head of Department.

About 60 teaching hours should be allocated to the teaching of forensic medicine.

There should be close liaison between the department of forensic medicine, and the departments of pathology & pharmacology.

The University examination in forensic medicine should be held 12 months after the examination in pharmacology, general pathology and microbiology i.e. at the end of the second clinical year.

46. *Preventive & Social Medicine.*—About 340 teaching hours may be allocated during the 1st & 2nd clinical years for preventive and social medicine.

A semester type of examinations may be organised at intervals of 18 months so that these examinations will be held during the 4½ years of the under-graduate medical course. The questions should be of the objective or multiple choice type.

The oral examination should be conducted in collaboration with teachers of the departments of medicine, paediatrics and microbiology.

C. Clinical courses

47. The main emphasis in the teaching of under-graduates should be in the teaching of the discipline of medicine, surgery, obstetrics and gynaecology and paediatrics.

In medicine only those problems should be taught in detail that the basic doctor is expected to meet in his day-to-day work. Special stress should be laid on regional and national health problems known to occur in the geographical area in which the medical college is located. In implementing the teaching programme there should be close collaboration between the departments of clinical medicine, and preventive and social medicine. To teach the preventive aspects of disease in one department, and the clinical and curative aspects in another, does not alter the present-day outlook of the medical student, who does not attach much importance to preventive work, however, long the course in preventive and social medicine may be.

48. *Surgery.*—In surgery the stress should be on the teaching of minor surgery and of life-saving measures in acute surgical emergencies. Details of advanced surgical and

operative techniques should be excluded from the under-graduate curriculum.

49. *Obstetrics and Gynaecology.*—It is distressing to note that in several medical colleges, social customs in the community that uses the teaching hospital, exclude the men students from being given practical training in obstetrics. Yet, in general practice in urban and rural areas, obstetric emergencies are commonly met with and have to be tackled immediately, as waiting for specialists' advice, or moving the patient to hospital will result in maternal and foetal mortality. This is a lacuna in under-graduate medical education that must be tackled. If possible the stress, during practical training in the internship period, should be on domiciliary midwifery.

50. *Paediatrics.*—40% of overall mortality and morbidity in the country is contributed by the paediatric age-group. This subject, better termed 'child health' should be treated at par with the general clinical disciplines and not as a speciality. At a WHO conference on the teaching of paediatrics to under-graduate medical students held in New Delhi in October, 1968, it was recommended that three months of the clinical period of three years of the MBBS course, should be devoted to study of paediatrics or child health. This period of three months may be broken up into two blocks of 1 month and 2 months each. During this period the curriculum should include growth and development, genetics, communicable disease, and nutrition. These aspects should be taught in collaboration with the basic science departments, and the department of preventive and social medicine.

51. *Teaching of specialities.*—The under-graduate medical curriculum in view of the great advances in medicine in the present century, has been, revised from time to time. The development of various specialities has also become inescapable reality, and call for further readjustments. However, no speciality can advance in isolation. There must be an inter-relationship between the different specialities in medicine and surgery. In spite of many difficulties, way and means have to be found to establish specialised departments, wherever possible, and also teach the specialities. If trained specialists are not available in teaching hospitals, suitable adjustments should be made. For example, in a medical college where there are no departments even in major specialities, the general physicians and general surgeons who have a definite bias in certain specialities must be given opportunities to train under-graduates in the respective specialities. However, it should be borne in mind that only basic principles in the various specialities should be taught to the under-graduates and in no case should the under-graduate curriculum which is already over-burdened, be extended to accommodate additional lectures, lecture-demonstrations and seminars in any of the specialities. As a matter of fact, every attempt should be made to trim even the existing under-graduate curriculum in such a way that only basic principles should be taught to the under-graduate, leaving out details to be taken in post-graduate medical education. The consensus of opinion amongst medical educationists all-over the world seems to be that an experienced and a senior specialist, wherever available, would be the proper person to teach under-graduates the basic principles in his speciality without burdening them with details. In this way, it may be possible to minimise the number of lectures, and instruct graduates in the basic principles of his speciality without burdening them with details. The major specialities in medicine, and surgery which should be included in the under-graduate curriculum should be determined, as well as the mode of training in these specialities, such as bed-side clinics, lecture-demonstrations, didactic lectures and seminars depending on the staff, beds, equipment including audio-visual equipment, and the time to be spent on the respective specialities.

52. No detailed training in specialities is necessary on the plea that a large number of patients seen by the general practitioners or the basic doctors belong to certain specialities. Only important problems in major specialities should be chosen and taught by the professors of the main specialities. If this choice is practised judiciously, the teaching in specialities which is quite enormous at present can be curtailed to a very reasonable level.

The present-day tendency of teaching even detailed operative techniques in specialities which can either be learnt by the under-graduate nor can effectively be taught in the limited period of time available is mostly a waste of effort, and prevents effective training in what he ought to know.

53. *Ophthalmology*.—40 to 50 lectures which are at present being allotted for the teaching in detail of this speciality, on the plea that are very common, should be considerably reduced. Problems like blindness due to trachoma, nutritional disorders, smallpox etc. should be emphasised, as also common diseases like glaucoma and cataract. These important problems that the basic doctor must learn can be taught in 10 to 15 lectures, if such lectures are combined with the demonstration of case material.

54. *Otorhinolaryngology*. 10-15 lectures with demonstration of case material should suffice.

55. *Dermatology*.—Skin ailments account in medical practice for a large number of cases. However, nearly 50% of cases in day-to-day practice belong to the scabies and furunculosis group, and recognition and treatment of such common conditions should form the basis for instructions in this speciality.

56. *Psychiatry*.—Even though the basic doctor has to deal daily with common psychiatric problems such as psychosomatic disorders, anxiety neurosis, etc., psychiatry has been a neglected field in this country. Some of the time saved by cutting down teaching in other specialities, can profitably be used in the teaching of psychiatry.

57. *Orthopaedics*.—With regard to the participation of specialists as examiners in the final MBBS examination, a strong plea has been put forward for orthopaedic specialists to be associated with examiners in surgery, to be associated with examiners in surgery, as orthopaedic cases form about 50% of surgical cases seen in a general hospital and a basic doctor should be able to treat common fractures and sprains even in a rural dispensary. This has become necessary as in recent years orthopaedic departments have been established in many teaching hospitals, and all cases of injuries of bones and joints are dealt with by orthopaedic surgeons, and the general surgeons have no real contact with such cases. What has been stated for orthopaedics holds good also for examiners in the ophthalmology and otorhinolaryngology also.

D. Research and Undergraduates

58. Wherever possible, undergraduate should during the effective periods be exposed to medical research. Such of those who evince interest in medical research and have aptitude for learning research techniques, may be encouraged to participate in research by providing special incentives such as award of stipends, etc.

E. Internship

59. Internship in the hospital is necessary for training doctors who are safe for the community. This period of training may be conducted in the district hospitals and not confined to the teaching hospitals alone, provided there is adequate medical, surgical, paediatric and obstetric staff in the district hospitals, and provided that staff can practise scientific methods, so that the intern does not forget what he has learnt in the teaching hospital. The intern, moreover, must not learn bad habits. Internship can be fruitful, and posting at the rural health centre can be increased from three to six months provided there is adequate supervision of the intern's work in the primary health centres and provided the faculty staff is willing to go by rotation to the rural areas and teach the students under rural conditions. During rural internship, proper and adequate training should be given in the following :

- (i) Family Planning,
- (ii) Nutrition,
- (iii) Immunisation,
- (iv) Health education,
- (v) Domiciliary obstetrics,
- (vi) Treatment of emergencies in the rural areas,
- (vii) Control of epidemics.

60. The remaining 6 months of the period of the internship could be spent in the wards, medical, surgical, and paediatric. Most obstetrics and gynaecology should be taught in the field. The interns should attend emergencies also in the casualty departments, while allotted to various wards. In the hospital the intern should work as a resident under supervision.

CHAPTER V

SUMMARY OF PRINCIPAL RECOMMENDATIONS

Licentiate course

(i) There is no need of a diploma or licentiate course in medicine.

Entrance requirements

(ii) For entrants to the M.B.B.S. course a course of 13 years is considered desirable. This may be :

(a) 11 years of schooling and 2 years of pre-medical studies;

or

(b) 12 years of schooling and 1 year of pre-medical training.

or

(c) In states with 10 years of schooling three more years of preparation for vocational training.

(iii) The premedical course may be conducted ordinarily in science colleges affiliated to different universities. Science colleges should be considered adequately equipped and staffed to conduct pre-medical courses, and candidates from only those that are certified as such should be eligible for admission to the medical course. Nevertheless, pre-medical courses may be conducted also by such medical colleges as are in a position to meet the high level of expenditure obtaining in medical colleges.

(iv) The pre-medical course should comprise study of language, physics, chemistry, biology, basic mathematics in relation to physics, and social sciences.

(v) The content of instructions for pre-medical course be compressed for completion in one academic year instead of 18 months as recommended by the Mudaliar Committee.

(vi) The curriculum for the pre-medical course should be drawn up by the Faculty of Science in consultation with the Faculty of Medical Sciences.

(vii) Institutions conducting pre-medical courses should provide facilities to candidates who pass the pre-medical examination but fail to get admission into medical colleges to continue either studies in the same science college to complete the B.Sc. course.

Method of selection

(viii) Entrance examination may be resorted to only in case of admission to medical colleges admitting candidates on all-India basis.

(ix) For selection to universities and colleges admitting candidates from more than one universities and otherwise than on an all-India basis in addition to marks obtained by them in the qualifying examination to the MBBS course, their performance in the Higher Secondary examination or similar other examination of the State which was common to all of them should also be taken into consideration with a view to approximate as far as possible to a uniformity of test in judging their relative merits.

Medium of instructions

(x) The medium of instruction in medical colleges, should for the present continue to be English.

Domicile restrictions

(xi) To begin with 5% of seats in medical colleges may be reserved for candidates from other states but this quota should be increased progressively to 10%.

Capitation Fee

(xii) Charging of capitation fee should be discouraged depending upon the availability of Government support to the college concerned for covering the gap created by loss of capitation fee.

Scheduled Castes/Tribes

(xiii) Reservation of seats in medical colleges for members of Scheduled Castes/Tribes may continue. They may be considered eligible if they obtain 5% marks less than that

M.B.B.S. Course

(xiv) The total period for M.B.B.S. course should be 4½ years and one year for internship. Of this 18 months should be devoted to instruction in pre-clinical subjects and 36 months to the para-clinical and clinical subjects. Internship should include posting in a rural centre for a period of at least 3 months.

(xv) The medical teaching and training should be orientated to produce a doctor conversant with the basic health problems of rural and urban communities, and who is able to play an effective role in preventive and curative health services.

(xvi) The teaching of preventive and social medicine should form an integral part of medical studies for the M.B.B.S. course, and marks obtained in this discipline should be ranked along with other disciplines for award of the M.B.B.S. degree.

(xvii) Teachers of preventive and social medicine should preferably have clinical experiences.

(xviii) Examination should be of the semester type.
Examinations

(xix) 25% of the total marks allocated for the University examination should be earmarked for internal assessment.

Syllabi and curriculum planning

(xx) Details of courses, content and syllabi in various subjects have been suggested.

(xxi) Suggestions for curriculum planning have also been made.

B. P. Patel, *Chairman*

APPENDIX—IA

No. F. 23-3/68-ME(UG)

Government of India

Ministry of Health Family Planning and U.D.
(Deptt. of Health & U.D.)

New Delhi, dated the 29th October, 1968

To

The Director General of Health,
Services, New Delhi.

SUBJECT : Medical Education Committee,
Sir,

In pursuance of the resolution passed at the 15th meeting of the Central Council of Health held in Bombay from 16th to 17th October, 1968 on Agenda item No. 3 (Copy enclosed), it is proposed to set up a Committee as under to hold preliminary discussions and to study all aspects of medical education and training of medical graduates in the light of national needs and resources, and to put up a considered draft for approval.

Chairman.

Sri Govind Narain,
Secretary,
Ministry of Health,
Family Planning and Urban Development.

Members.

Dr. P. K. Durajswami,
Director General of Health Services,

Dr. D. V. Virkar,
Surgeon General to the Govt. of Maharashtra,
Bombay.

Dr. K. C. Sarabadhikari,
Director of Health Services,
West Bengal,
Calcutta.

Sri Ananta Padmanabhan,
Secretary,
Deptt. of Health,
Govt. of Madras,
Madras.

Dr. Moti Singh,
Director of Health Services,
Punjab,
Chandigarh.

Dr. A. C. Joshi,
Vice-Chancellor,
Banaras Hindu University,
Varanasi.

Dr. N. Thangavelu,
Dean,
Medical College,
Trivandrum.

Dr. K. L. Wig,
Director,
All India Institute of Medical Sciences,
New Delhi.

Dr. Jacob Chandy,
Principal,
Christian Medical College,
Vellore.

Dr. V. M. Bhende,
Dean,
B. J. Medical College,
Poona.

Dr. S. Govindarajan,
Executive Director,
Indian Association for Advancement of Medical Education,
Madras.

Dr. P. J. Phillip,
Secretary,
University Grants Commission,
New Delhi.

Member-Secretary

Dr. (Mrs.) S. Achaya,
Dy. Director General (Medical),
Dte. General of Health Services,
New Delhi.

You are requested to accept membership of the committee and obtain the concurrence of your superior authority (wherever necessary).

You are also requested to attend the meeting of the Committee to be held on the 11th November, 1968 at 10 A.M. in the Office of Shri Govind Narain, Secretary, Ministry of Health, Family Planning and Urban Development in room No. 347, Third Floor, South Wing Nirman Bhavan, New Delhi.

The detailed programme of study would be worked out by the Committee themselves. While examining various aspects of medical education they would consider particularly the development of the medical curriculum in relation to national requirements, the need for uniformity of syllabus, apportionment of time between didactic and practical teaching, selection of entrants to medical colleges, reciprocity between various medical institutions and Universities, and domiciliary restrictions in the matter of medical admission.

T.A. and D.A. of official members will be met from the source from which they draw their pay. In the case of non-official members, the T.A. and D.A. will be met from the budget of the Ministry of Health, Family Planning and Urban Development.

You are requested to attend the meeting.
Kindly confirm.

Yours faithfully,

R. N. Madhok,

Joint Secretary to the Govt. of India

APPENDIX—IB

No. 23-3/68-ME(UG)

Government of India

Ministry of Health, F.P. and Urban Development
(Deptt. of Health & U.D.)

New Delhi, dated the 28th November, 1968.

To

The Director General of Health Services,
New Delhi.SUBJECT : Constitution of a Committee to examine Medical
Education in the country.

Sir,

I am directed to say that the Central Council of Health had at its meeting held in Bombay from 16th to 17th October, 1968 passed a resolution stressing the need for the appointment of a Committee to examine Medical Education in all its aspects. A copy of the resolution is enclosed. In pursuance of the resolution, the Government of India are pleased to appoint a Committee consisting of the following members to study all aspects of medical education and training of medical graduates in the light of national needs and resources :—

Chairman.

- (1) Secretary,
Ministry of Health,
Family Planning & Urban Development.

Members.

- (2) Shri M. G. Pimputkar,
Additional Secretary,
Ministry of Health,
Family Planning and Urban Development.
- (3) Dr. P. K. Duraiswami,
Director General of Health Services.
- (4) Dr. D. V. Virkar,
Surgeon General to the Government of Maharashtra,
Bombay.
- (5) Dr. K. C. Sarbadhikari,
Director General of Health Services.
West Bengal,
Calcutta.
- (6) Shri Ananta Padmanabhan,
Secretary,
Government of Madras,
Department of Health,
Madras.
- (7) Dr. Moti Singh,
Director of Health Services,
Punjab,
Chandigarh.
- (8) Dr. A. C. Joshi,
Vice Chancellor,
Banaras Hindu University,
Varanasi.
- (9) Dr. N. Thangavelu,
Dean,
Medical College,
Trivandrum,
New Delhi.
- (10) Dr. K. L. Wig,
Director, All India Institute,
of Medical Sciences,
New Delhi.
- (11) Dr. Jacob Chandy,
Principal,
Christian Medical College,
Vellore.
- (12) Dr. Y. M. Bhende,
Dean,
B. J. Medical College,
Poona.
- (13) Dr. S. Govindarajan,
Ex-Director,
Indian Association for Advancement, of Medical
Education,
Madras.

- (14) Dr. C. B. Singh,
1-Kamla Nagar,
Kanpur-12 (U.P.)
- (15) Dr. Tulsi Das,
Officiating President,
Medical Council of India,
207, Sector 16,
Chandigarh.

- (16) Dr. P. J. Phillip,
Secretary,
University Grants Commission,
New Delhi.

Member-Secretary.

- (17) Dr. (Mrs.) S. Achaya,
Deputy Director General (Medical),
Dte. General of Health Services,
New Delhi.

2. While examining various aspects of Medical Education, the Committee would consider particularly the development of the medical curriculum in relation to national requirements, the need for uniformity of syllabus, apportionment of time between didactic and practical teaching, selection of entrants to medical colleges, reciprocity between various medical institutions and Universities and domiciliary restrictions in the matter of medical admission.

3. The Committee will submit its report by the end of December, 1968 at the latest.

4. The expenditure on T.A. and D.A. of officials is to be met from the source from which their pay is drawn. The T.A. and D.A. of non-officials will be governed by the orders issued by the Ministry of Finance vide their O.M. No. F. 6(26)-EIV/59, dated the 5th September, 1960.

5. The expenditure involved on T.A. and D.A. of non-officials and contingent expenditure, if any, will be met from the sanctioned budget allotment of the Directorate General of Health Services.

Yours faithfully,
V. K. SAMANTROY,
Under Secretary.

N. F. 23-3/68-ME (UG)

Copy with a copy of the enclosures, forwarded to the Members for necessary action.

Under Secretary,

No. F. 23-3/68-ME(UG)

Copy for information to the Accountant General, Central
Revenues, New Delhi.

Sd/- Under Secretary.

Copy to :—

1. J.S.(U)
2. Addl. D.G. 20 spare copies.
3. Budget Sec.
4. Cash Section.

APPENDIX—IC

No. 23-3/68-ME(UG)

Government of India

Ministry of Health & F.P. & W.H. & U.D.
(Deptt. of Health)

New Delhi, dated 11-4-1969.

To

The Director General of Health Services,
New Delhi.SUBJECT : Constitution of a Committee to examine Medical
Education in the country.

Sir,

I am directed to refer to this Ministry's letter of even number, dated November 28, 1968 on the subject mentioned above and to say that the Government of India are pleased

to appoint Commissioner (Family Planning) as a Member of the Committee. It is requested that he may be associated with the Committee in the remaining stages of its work.

2. The Government of India are pleased to decide, in supersession of para 3 of this Ministry's letter of even number dated November 28, 1968 that the Committee should submit its report by the end of June, 1969.

Yours faithfully,
V. K. SAMANTROY,
Under Secretary.

APPENDIX—II

Resolution on Medical Education—15th Meeting Central Council of Health (October, 1968)

1. Having noted that the seats reserved for Scheduled Caste/Tribe candidates in the undergraduate Medical Course are not fully utilised due to inadequate number of students in these categories securing minimum qualifying marks, the Central Council of Health resolves that necessary steps be taken by state governments to arrange for extra coaching to be given to such students, thereby enabling them to improve their performance in the qualifying examination.

2. Having noted the recommendation of the Third Meeting of the executive committee of the Central Council of Health of the need to study all aspects of Medical Education in the light of National needs and resources it is further resolved that:

- (a) A preliminary meeting of officials and experts be called within a month, spade work done—grievances complaints and problems posed and papers got ready for the main conference;
- (b) and then within the next three months, full-fledged conference of officials, experts, vice-chancellors and ministers be called at Delhi to decide about the further course of action, in the light of the papers presented and difficulties and problems posed by the preliminary meeting.

ANNEXURE—III

Report of the Sub-Group I (on Pre-Medical Education) of the Medical Education Committee

The Medical Education Committee appointed by the Ministry of Health, Family Planning and Urban Development, vide Office Order No. F. 23-3/68-ME(UG), at its first meeting on 11th November, 1968 split into three sub-groups. The sub-group on Pre-medical Education consisted of:—

1. Shri M. G. Pimpurkar Convenor
2. Dr. A. C. Joshi,
3. Dr. Tulsidas,
4. Dr. P. J. Philip,
5. Dr. Jacob Chandy,
6. Dr. Moti Singh.

Terms of reference

To report on pre-medical education with reference to:—

- (a) entrance requirements;
- (b) methods of selection of students,
- (c) domicile restrictions; and
- (d) matters relating to admission of Scheduled Caste and Scheduled Tribe Candidates.

The sub-group held three meetings on 11th November 1968, 28th November 1968 and 3rd December 1969.

Due to certain unavoidable reasons, in no meeting could all the members meet together. *Three of the members of the present Group were previously members of the Committee set up by the Government to examine the question of maintenance of high standard of preparatory training in the pre-medical course (Mudaliar Committee on Pre-medical Education 1967-68). The report of that Committee was available to the Sub-Group.

A copy is placed below.

*Dr. A. C. Joshi, Tulsidas, and P. J. Philip.

Entrance requirements

The basic academic requirements for admission to a medical college after Matriculation (ten or eleven years at school) at present are two years science study in a college and after Higher Secondary (11 year course) a one-year study in a college as pre-Medical student. This means a total of about 12 years of school and college studies. The Mudaliar Committee has opined that a period of study of 12 years, in whatever manner the period may be divided, should be completed before a candidate can seek admission to a pre-medical course. In the light of the introduction of additional subjects (Sociology, Psychology and Anthropology) for the pre-medical curriculum, apart from the general strengthening of basic science subjects, that Committee considered it desirable to have a pre-medical course of 18 months.

This pre-medical course can preferably be conducted in a medical college to be followed by a pre-clinical course of 18 months. Those who do not go for the medical degree should be able to take a B.Sc. degree after these pre-medical and pre-clinical courses. Dr. Chandy supported this view as this would give adequate scope to orient a student for medicine in the pre-medical and pre-clinical stage from the point of view of future requirements. For example, Physics or Mathematics would be taught not with a view to cover the subject of Physics of Mathematics as such, but with a view to make it a useful handmaid in the service of medicine.

The other members however thought that this would involve avoidable expenditure in facilities, accommodation, equipment and manpower. If the pre-medical course is held at a university/degree college, it would help in getting those students who prove lame ducks to join easily the main stream of university education. They considered that the present preparation of a student who takes Higher Secondary and a year's pre-medical as inadequate. They agreed that the years of study the pre-medical should be 12 but they considered that the pre-medical course need not extend beyond a year. This, they opined, would fit in the national pattern of university education. The lame ducks, can, having put in 13 years of study, do two years more and take a degree. The national pattern envisages a degree after 15 years of study.

Pre-Medical Curriculum

The pre-medical course should comprise of studies of Physics, Chemistry, Biology, Basic Mathematics in relation to Physics, introduction to statistics and language. Introduction to social sciences is important as a basis for the study of preventive and social medicine. With the modern advancement in medical sciences, syllabi for these subjects have to be suitably modified and thus material which have little bearing on medical education require to be deleted. Though this approach is similar to the one adopted by Mudaliar Committee, the sub-group thought that the choice of contents should be so made as to compress them within one year. The syllabi for pre-medical education should be drawn jointly by medical and non-medical scientists who should work in collaboration with each other.

Method of selection of candidates

The Mudaliar Committee did not favour the holding of an admission test to select students for admission to medical colleges except in institutions admitting candidates on an all India basis. On the other hand, considerable variations have been observed in the standards of assessments and making of different examining bodies. In each State there are more than one university/examining Board for conducting examinations. Standards of pass percentage and marking vary. Simply going by the percentage of marks obtained at these examinations introduces avoidable disparity. The Group therefore, favoured the provision of a common test for entrance to all medical colleges in one State/Territory.

Medium of Instruction

If medical education is to have a national standard, if all the students have to comprehend the instructions, if exchange of teachers from one institution to another has to be made feasible and if the medical graduates are to be enabled to practice in any part of India, the medium of Medical instructions has to be the same throughout the country. In the prevailing circumstances and with a view to maintaining contracts with the development in international field, the group

recommends that the language must be for the present English.

Domicile restrictions

Domicile restrictions are considered undesirable in the larger interest of intellectual attainment and national unity. In case it is not found practicable immediately, a beginning may be made in a manner and with a view to removing them completely within ten years.

Capitation fee

The system of charging capitation fee by some private medical institutions tends to lower the standard of education. Affluent candidates with lower percentage of marks generally secure admission in such colleges. Charging of capitation fee by medical college, therefore, was not favoured. The Government should support the college for the gap created by the loss of capitation fee.

Admission of Scheduled Castes/Scheduled Tribes

Reservation of seats for Scheduled Caste/Scheduled Tribes may continue, but the difference between the minimum marks obtained by a general student and the level prescribed for the Scheduled Caste/Scheduled Tribes student may not be more than 5 per cent.

Period of medical studies

At present a student joining a medical course after Higher Secondary puts in 1½ plus 1 plus 1½ plus 1-17½ years of study before medical graduation. Though the Committee thought that course of study prior to pre-clinical should increase by one year, this should not result in lengthening the total course of study to 18½ years. They were of the opinion that the course could be restricted to 18 years by cutting the internship period to 6 months. The majority of the sub-group were of the opinion that a long internship has not brought good results. The interneers who work for the hospital also demand pay, furnished quarters and all other facilities which a house surgeon or a Government doctor enjoys. The reduction in internship period from one year to six months, they thought, would yield better results with less expenditure.

ANNEXURE—IV

Minutes of the Meeting of the Sub-Group II Appointed by the Medical Education Committee

The sub-group appointed by the Medical Education Committee to consider and make recommendations for pre-clinical and para clinical courses in the under-graduate medical curriculum met at 11.30 A.M. on the 11th November, 1968 under the Chairmanship of Dr. S. Achaya, Deputy Director General of Health Services. The following member were present.

Dr. K. C. Sarbadhikari—Director of Medical Services, West Bengal.

Dr. S. Govindarajan—Representative of the Indian Association for the Advancement of Medical Education.

Dr. M. Thangavelu—Principal, Medical College, Trivandrum.

Dr. Y. M. Bhende—Dean, B. J. Medical College, Poona.

Before discussing the pre-clinical courses the Group made certain observations.

1. That the pre-medical course should be integrated with the medical course.

2. That the recommendations of the pre-medical Education Committee be accepted, and the pre-medical course extended from 12 months to 18 academic months; and some instruction in anatomy, physiology and biochemistry be included during this period.

3. Heads of science departments of the medical colleges who would be responsible for pre-medical instruction should have the same academic qualifications and experience of their counterparts in the science departments of university colleges and should form a part of the Faculty of Medicine.

4. *Pre-clinical course*—A period of 18 academic months is necessary for instruction in Anatomy, Physiology and Biochemistry, and Preventive and Social Medicine.

4.1. Of the 1660 hours available during this period, 700 hours may be allocated for instruction Anatomy including histology. This time is considered adequate as the teaching

of anatomy has been introduced at the pre-medical stage and it is not considered necessary to go into details of structure, or to dissect the entire human body.

4.2. Instruction in histology, embryology and principles of human genetics is necessary. It was not considered necessary to include instruction in physical anthropology.

4.3. During the period of instruction in Anatomy one period a month should be a joint teaching-cum-demonstration session with clinical material illustrating applied aspects of anatomy in relation to surgery, paediatrics, medicine, obstetrics and gynaecology.

4.4. Didactic teaching must be reduced, and seminar and group discussions under adequate supervision encouraged.

5. *Physiology including biophysics*—550 teaching hours should be allocated for teaching of physiology on the premise that the teaching of this subject has begun during the pre-medical course. During this period, the principles of biophysics may also be enunciated and demonstrated. One period a month should be a joint teaching-cum-demonstration session with clinical material illustrating the applied aspects of physiology in relation to medicine, psychiatry and paediatrics.

6. *Bio-Chemistry*—350 teaching hours may be allocated for the teaching of bio-chemistry, with the premise that instruction in the subject has begun during the pre-medical course.

The purpose of teaching bio-chemistry in the pre clinical years should be to enable the prospective physician to comprehend the bio-chemical basis of life, and the deviation in common disorders. The student should handle bio-chemical samples, and should appreciate the findings in health, and in common disorders of function. It would therefore, be necessary for the teacher of bio-chemistry to demonstrate suitable patients to the students in collaboration with clinicians.

6.1. A doctor attached to a primary health centre or peripheral hospital, and a general practitioner particularly in the rural areas, does not have the facilities provided by referral laboratories. It is therefore, desirable that he should be able to perform simple bio-chemical investigation, and adequate practical training during the pre-clinical course must be ensured.

6.2. Didactic lectures should be reduced and seminars and group discussions encouraged.

7. Preventive and Social Medicine.

7.1. To serve as a background to the teaching of social and preventive medicine, social sciences should be included in the pre-medical curriculum.

7.2. 60 teaching hours may be allocated for the teaching of preventive and social medicine during the pre-clinical course.

7.3. The curriculum for this period should include biostatistics, ecology of disease, demography, growth and nutrition, medical economics, sociology, and medical ethics.

7.4. Participation of general practitioners in seminars and group discussions should be organised.

8. *General considerations*—It was suggested that teaching aids such as Charts, and slides, should be made available to departments in medical colleges from a central agency organised either by the Central or State Governments.

9. Examinations

9.1. Examinations should be of the semester type and held twice during the 18 months period of pre-clinical training in the subjects of Anatomy, physiology and Biochemistry; and once in the discipline of Preventive and Social medicine.

9.2. 30% of total marks for the university examination, should be earmarked for internal assessment.

9.3. In the semesters examination held during the pre-clinical period in anatomy, physiology and bio-chemistry there should be one or two papers each of three hours duration with the objective type or multiple choice questions. This paper may have sections for each of the disciplines of anatomy, physiology, and Biochemistry. The oral examinations may be conducted by a joint board of examiners in all three disciplines, and in the 2nd semester examination the examiner in preventive and social medicine should be a member of the board of examiners.

10. *Details of curriculum.*

10.1. It was agreed that on the guidelines proposed, detailed curricula may be drawn up.

10.2. Consideration will have to be given to apportioning some part of the curriculum for Anatomy, Physiology and Biochemistry to the later six months as the pre-clinical course. However, there should not be too much encroaching on time allocated for study of English, Mathematics, Physics, Chemistry, Biology and Social Sciences during this period.

10.3. Dr. Sarbadhikari would arrange to have the curriculum for anatomy drawn up. It was agreed that Dr. Sharma, Professor of Biochemistry, St. John's Medical College, Bangalore may be requested to draw up the curriculum for Physiology and Biochemistry in consultation with each other. Dr. Anand, Professor of Preventive and Social Medicine, Lady Hardinge Medical College may draw up the curriculum for preventive and Social Medicine to be taught during the pre-clinical period within the total curriculum for this subject.

11. *Family Planning*—During the pre-clinical course, the departments of Anatomy, Physiology, Biochemistry and Preventive and Social Medicine may organise a joint teaching session for instruction in the principles of family planning, the curriculum for which has been formulated by the Medical Council of India.

12. *Para-clinical Course*—It was considered necessary to re-organise the courses of study and examinations in the para-clinical course, in pharmacology and pathology and microbiology. The study of para-clinical subjects may cover a period of two years after completion of the pre-clinical course. During the first year instruction and examination in Pharmacology, General Pathology and Microbiology, would be undertaken, and in the 2nd year instruction and examinations in special pathology and forensic medicine. Paediatrics and forensic medicine may be taught during this period and the teaching and examination in ophthalmology may or may not be included within this period. However, the details of the curriculum for paediatrics and ophthalmology will have to be dealt with under clinical subjects.

13. *Pharmacology*—It was agreed that the course, in pharmacology, general pathology and microbiology should be completed in the first year of the clinical period. About 200 teaching hours may be allocated to the teaching of pharmacology and toxicology.

13.1. Instruction in pharmacy and pharmacognosy should be greatly reduced and experimental pharmacology be introduced.

13.2. A close liaison between the departments of pharmacology and the department of medicine must be maintained for teaching and training, by seminars and group discussions in which clinical teachers participate.

13.3. The university examination in pharmacology may be held 12 months after the last university examination in pre-clinical subjects. Questions may be of the objective or multiple choice type. The clinical teachers in medicine should be associated with the oral examination.

14. *General Pathology, Chemical Pathology, Microbiology and Parasitology*—It was agreed that the teaching of general pathology may be done concurrently with microbiology and parasitology, but special pathology should be taught with clinical subjects.

14.1. The departments of pathology and microbiology must be independent departments.

14.2. Because of its wide spread prevalence in the country, parasitology is an important aspect for instruction of the undergraduate medical student. The epidemiological concepts, national programmes for control, and preventive aspects including the significance of life cycles, should be taught by the department of preventive and social medicine, and the clinical manifestations of infestation and investigative techniques by the department of microbiology.

14.3. About 240 hours should be allocated for instruction in general pathology, microbiology, biology, microbiology and immunology.

14.4. There should be close liaison between the departments of pathology, microbiology, preventive and social medicine and the clinical departments.

14.5. Didactic lectures should be reduced and seminar and group discussions with participation of clinical teachers should be the chief method of instruction.

14.6. During the course of instruction in chemical pathology the collaboration of the staff of the department of biochemistry should be sought.

14.7. The examination in general pathology and microbiology should be held 12 months after the final examination in pre-clinical subjects. The paper of the objective or multiple choice type must cover both subjects, and the oral examination must be conducted jointly by the heads of the departments of pathology, microbiology, preventive and social medicine and internal medicine.

15. *Special pathology*—The teaching of special pathology must be closely linked with teaching of clinical subjects.

15.1. About 200 teaching hours should be allocated to the teaching of special pathology.

15.2. Didactic teaching should be reduced and seminars, groups discussions and clinicopathological conferences with participation of clinical teachers should be organised.

15.3. The university examination in special pathology should be held 12 months after the examination for general pathology, and microbiology i.e. at the end of the second clinical year.

15.4. Question in theory may be of the objective or multiple choice type.

15.5. The conduct of the oral examination must be done jointly with teachers in the clinical departments of internal medicine, surgery, obstetrics and gynaecology.

16. *Forensic Medicine.*

16.1. It must be realised that very often a medical graduate posted in district towns and taluk hospitals may be called upon to conduct medico-legal post-mortems and to give his opinion in medico-legal cases. The training in forensic medicine as at present conducted is inadequate to meet this need.

16.2. A department of forensic medicine must be an independent one with full time staff, and a Professor as Head of the Department.

16.3. About 75 teaching hours should be allocated to the teaching of forensic medicine.

16.4. There should be close liaison between the departments of forensic medicine, and the departments of Pathology and pharmacology.

16.5. The university examination in forensic medicine should be held 12 months after the examination in pharmacology, general pathology and microbiology i.e. at the end of the second clinical year.

17. *Preventive and Social Medicine*—About 200 teaching hours may be allocated during the 1st and 2nd clinical years for preventive and social medicine.

17.1. The semester type of examinations may be organised at intervals of 18 months so that these examinations will be held during the 4½ years of the undergraduate medical course. The questions should be of the objective or multiple choice type.

17.1. The oral examination should be conducted in collaboration with teachers the departments of medicine paediatrics and microbiology.

18. *Framing of curricula*—It was agreed that request for the framing of curricula in accordance with suggestions made for each course may be solicited from :—

Pharmacology—Dr. Yahya, Professor of Pharmacology Medical College, Chingleput.

Microbiology, Virology, Mycology and Immunology—Dr. S. Govindarajan, Dean, Medical College, Madras.
General and Chemical Pathology—Dr. M. Thangavelu Principal, Medical College, Trivandrum.

Special Pathology—Dr. Y. M. Bhende, Dean B. J. Medical College, Poona.

Forensic Medicine—Dr. C. B. Gopalakrishna, Professor of Forensic Medicine, Medical College, Madras.

Preventive and Social Medicine, Dr. D. Anand, Professor of Preventive and Social Medicine, Lady Hardinge Medical College, New Delhi.

18.1. Dr. S. Govindarajan was requested to make arrangements to send the curricula framed by Dr. Yahya and Dr. Gopalakrishna.

18.2. The curricula will have to be sent on or before 12-11-1968, so that they may be put up for consideration at the next meeting of the main committee, which will be called at the end of December, 1968.

ANNEXURE V

REPORT OF THE SUB-GROUP III ON

"CLINICAL SUBJECTS AND INTERNSHIP"

Convener

Dr. P. K. Duraiswami

Members

Dr. K. L. Wig

Dr. D. V. Virkar

Dr. C. B. Singh

Shri Ananta Padmanabhan

1. DEFINITION OF "BASIC DOCTOR"

(a) A basic doctor is one who is well conversant with the day-to-day health problems of the rural and urban communities and who is able to play an effective role in the curative and preventive aspects of regional and national health problems. He should have the competence to judge which case should be referred to a Hospital or a specialist. He should be able to give immediate life saving aid to all acute emergencies. He should have competence in clinical methods i.e. history taking, physical examination, diagnosis and treatment of common conditions.

(b) He should be capable of constant advancement in his knowledge by learning things for himself by having imbibed the proper spirit and learned the proper techniques for this purpose during his medical course. For this purpose, a good library is essential and an undergraduate should be encouraged to make the best use of it.

2. CONTENT OF THE CURRICULUM :

The content of the curriculum should be designed with the above aims; it should be need based. As all the medical colleges have not only to produce basic doctors but also future specialists, teachers and research workers from the same batches from which predominantly, the basic doctors will be produced, it is essential that the student should be imparted adequate knowledge in basic medical sciences to enable him to progress further after becoming a doctor. He must, moreover, understand what modern medical sciences and clinical practice are based on. Such knowledge will be of great advantage even to the basic doctors for from them also many will turn back to specialisation and scientific research. The age at which the student reaches the clinical stage is far too premature for him to take a decision and choose whether he wants to be a basic doctor or a scientific worker. It will be unfair to him if others take a decision on his behalf whether he should take to specialisation, scientific research, or remain in the general practice field of a basic doctor.

We should have a better knowledge of what the day-to-day problems are to decide about the content of the curriculum. Some surveys in this respect may be of some help. Regional and national problems are well known.

While a certain amount of didactic training is essential even that should mostly be in the form of tutorial groups seminars etc. In the clinical stage stress should be on clinical clerkship and practical work in the wards and the O.P.D. and in the community in the Internship stage. Teaching of details in specialities and surgical techniques and advanced laboratory techniques should be left to the post graduate

stage. Simple routine laboratory procedures must, however, be taught by making the students practise them. The number of such procedures is very limited.

The main stress in the training of under graduates should be in the teaching of the main disciplines which are as follows :

1. Medicine
2. Surgery
3. Obstetrics and Gynaecology and
4. Paediatrics

Enough stress has not so far been laid in this country on training in paediatrics. Proceedings of a recent W.H.O. conference on Paediatric Education at the under-graduate level should be obtained from that organisation. These will probably be available from the W.H.O. in a few days time. As the Paediatric group forms about 40% of morbidity and mortality of the population, this subject which should better be termed Child Health, should be treated at par with the other disciplines.

In medicine only those problems should be taught in detail which the basic doctor is going to meet in his day-to-day work. Special stress should be laid on regional and national health problems according to the area in which the medical college is situated. Preventive aspects of these diseases should be taught in collaboration with the Preventive and Social Medicine Department along with the teaching of clinical medicine. To teach preventive aspects in one department and the clinical work in another department will not change the concept of the present day student who does not attach much importance to preventive work, however long the course of Preventive and Social Medicine may be. In surgery the stress should be on teaching of minor surgery and training the students in life saving measures in acute surgical emergencies. Details of advanced surgical and operative techniques in surgery should be excluded from the under-graduate curriculum. In obstetrics and Gynaecology, the stress should be on training in domiciliary midwifery. The basic doctor should, however, know when the case should be referred to the hospital, as is necessary for the practice of other disciplines also. In Pediatrics growth and development and genetics have so far been a neglected field. The majority of communicable diseases should also be taught as a part of this discipline. Nutrition has to be taught in collaboration with certain basic medical sciences mostly as a part of this discipline. Growth and development has to be taught in collaboration with certain basic medical sciences and Preventive and Social Medicine.

3. METHODS OF TEACHING :

(i) Small group teaching. (ii) Case demonstrations (iii) Case conferences in which students take an active part and audiovisual aids should be encouraged. Didactic lectures should be diminished to as low a level as possible, though a certain number of them will be essential. However, detailed instructions on teaching methods cannot be laid down. Much will depend on the preferences of the teacher and the training of the teacher himself. Programme text, if available, will also prove useful especially when the students want to revise his factual knowledge himself. Teaching machines and similar aids may also be utilised for the same purpose, if possible.

Integration is a welcome idea but if it is to be practised radically it demands a large faculty and a lot of preparation on the part of the faculty. Such facilities are not available in most of the medical colleges in our country. However, collaborative teaching should be encouraged in the preclinical, para-clinical and clinical areas and practised much more than is being done at present. For example, in the All India Institute of Medical Sciences there are no separate lectures in surgery or medicine. Most of the lectures in medicine surgery and paediatrics are based on the background of pathological changes and the best man available for the teaching of a Clinico-pathological problem is allotted the teaching of that topic. Quite a lot of such teaching is, moreover, done in combined seminars at which the physicians, surgeons, the paediatricians and pathologists and quite often teachers of Preventive and Social Medicine are present at the same time. This practice has already paid good dividends in the Institute and can, therefore, be highly commended for implementation in other medical colleges, especially in view of the fact that the examination in Pathology is being held as a part of the Second MBBS examination. Surgical pathology conferences,

Clinico-radiological conferences are also held with the same idea but these experiences are practised at the post-graduate stage. On the other hand teaching of pathology, with clinical material as, its basis has proved to be an effective method of teaching pathology. Teachers from basic sciences are also brought in frequently to partake in combined clinical seminars. However, such teaching is possible only in those colleges where the size of the faculty is large and collaborative teaching is planned properly. Completely integrated teaching as practised in certain universities of U.S.A. right from the start of a student's career as an undergraduate, may not be possible in our country as yet.

4. TEACHING OF SPECIALITIES :

The undergraduate medical curriculum has been revised from time to time in view of the great advances in medicine in the present century. The development of various specialities has also become an inescapable reality. The growth and development of various specialities have called for further readjustments. However, no speciality can advance in isolation. There must be an inter-relationship between the different specialities in medicine and surgery. In spite of many difficulties, ways and means have to be found to establish specialised departments, wherever possible, and also teach the specialities. If trained specialists are not available in a teaching hospital, suitable adjustments should be made. For example, in a medical college where there are no departments even in major specialities, the general physicians and general surgeons who have a definite bias to certain specialities, must be given opportunities to train undergraduates in the respective specialities. However, it must be categorically stated that only basic principles in the various specialities should be taught to the under-graduates and in no case the undergraduate curriculum which is already overburdened should be extended to accommodate additional lectures, lecture-demonstrations and seminars in any of the specialities. As a matter of fact, every attempt should be made to train even the existing undergraduate curriculum in such a way that throughout the course only basic principles should be taught to the undergraduates, leaving out details to be taken up in postgraduate medical education. The consensus of opinion among the medical educationists all over the world seems to be that an experienced and a senior specialist, wherever available, would be the proper person to teach the undergraduates in the particular speciality, as he will teach the undergraduates the basic principles in his speciality without burdening them with details. In this way, we may be able to contain the number of lectures, lecture-demonstrations and seminars for the various specialities in medicine and surgery to the absolute minimum with a view to lighten, if possible, even the existing load in the undergraduate curriculum. The major specialities in medicine and surgery which should be included in the undergraduate curriculum should be determined as well as the mode of training in these specialities such as bed-side clinics, lecture demonstrations, didactic lectures and seminars depending on the staff, beds, equipment including audio-visual equipment and the time to be spent in the respective specialities.

No detailed training in specialities is necessary on the plea that large number of patients seen by the general practitioners of the basic doctors belong to certain specialities. Only important problems in major specialities should be chosen and taught by the Professors of the main specialities. If this choice is practised judiciously the teaching in specialities which is quite enormous at the present moment can be diminished to a very reasonable level. To take an example, instead of 40 to 50 lectures in Ophthalmology which are being allotted to this speciality at present for teaching this subject in detail, on the plea that eye diseases are very common, we can pick up problems like blindness due to trachoma, nutritional disorders, smallpox etc. and also important diseases like glaucoma and cataract etc. These important problems that the basic doctor must learn can be taught in 10 to 15 lectures, if such lectures are combined with the demonstration of case material. The same is true of Dermatology which accounts for a large number of cases in practice. However, nearly half of dermatology cases in the day to day practice belong to scabies and furunculosis groups etc. The present day tendency of teaching details in all subjects and even detailed operative techniques in specialities which can neither be learnt by the undergraduate nor can effectively be taught in the limited period of time available is mostly a waste of effort and prevents effective training in what he ought to know.

Psychiatry has been a neglected field in this country even though the basic doctor has to deal daily with common psychiatric problems such as psychosomatic disorders, anxiety neurosis etc. Some of the time saved by cutting down teaching in specialities can profitably be used in the teaching of psychiatry.

With regard to the participation of specialists in the final MBBS examination, a strong plea has been put forward for orthopaedic specialists to be associated with examiners in surgery as orthopaedic cases from about 50% of surgical cases seen in a general hospital and a basic doctor should be able to treat common fractures and sprains even in a rural dispensary. This has become necessary in recent years with the opening of orthopaedic departments in many teaching hospitals and all cases of injuries of bones and joints are dealt with by the orthopaedic surgeon, so that the general surgeons have no real contact with such cases. What has been stated for orthopaedics, holds good also for Ophthalmology and Otorhinolaryngology.

5. RESEARCH AND UNDERGRADUATES :

Wherever possible, undergraduates should be exposed to medical research during the elective periods. Such of those who evince interest in medical research and are found suitable for learning research techniques, may be encouraged to participate in research by providing special incentives such as award of stipends etc.

6. ASSESSMENT :

The present examination system will have to continue for some time more for want of a better alternative. Objective type or multiple choice questions should be brought into our system of examinations partially though not completely as yet. Clinical portion of the examination should be considered far more important than the theory. This clinical examination should not be conducted in a haphazard way but should be conducted in detail especially with a view to assess the ability of the student in clinical methods, i.e. history taking and physical examination. During the discussions on cases the examiner should judge whether the student can think logically and arrive at a diagnosis on clinical grounds upon which he will have to depend when working in the field.

Internal assessment is certainly preferable to the present examination system but can be a true index of the student's development and competence, if the teacher-student ratio is good and the teacher knows his students and can judge properly their progress, and tries to help the students in their progress at the right time. If the above conditions are not available the internal assessment very often becomes a farce and is not a proper evaluation of the student's competence and ability. For the time being, only a portion of his marks should depend on internal assessment which should include record of day-to-day progress, attendance in ward work and didactic teaching, periodic examinations, terminal examinations, his behaviour in the wards, and his attitude to patients, as it is very important to develop a correct doctor patient relationship throughout the clinical course. Wastage which under our present system of examinations is considerable, should no doubt be avoided or minimised. However, we can avoid it only if our selections at the time of admissions to the undergraduate course are good, if those students who cannot make the grade are weeded out at a very early stage, if those who are not progressing well can be brought up to the standard by proper guidance, and if the examiners want to test what the student knows and do not concentrate on what the student does not know.

7. INTERNSHIP :

Internship in the hospital is necessary if we want to produce doctors who are safe for the community. It may be spread out into the district hospitals and not confined to the teaching hospitals, provided there is adequate medical surgical, paediatric, and obstetrics staff in the district hospitals and provided that staff can practise scientific methods, so that the intern does not forget what he learnt in the teaching hospital. The intern, moreover, must not learn bad habits. Internship can be fruitful and can be increased from three to six months provided there is adequate supervision of the interns' work in the primary health centres and provided the faculty staff is willing to go by rotation to the rural areas and teach the students under rural conditions. During rural internship, proper and adequate training should be given in the following :—

1. Family Planning
2. Nutrition
3. Immunisation
4. Health Education
5. Domiciliary obstetrics
6. Treatment of emergencies in the rural areas
7. Control of epidemics.

The rest of the 6 months can be spent in the wards—medical, surgical and paediatrics wards. Most of Obstetrics and Gynaecology should better be taught in the field. The interns should attend emergencies also in the casualty department while allotted to various wards. In the hospital the intern should work as a resident under supervision.

8. REFRESHER COURSES :

To have 'Refresher courses' is a good idea and all medical colleges should call back their old students every few years for this purpose. Such a procedure will, moreover, give the college authorities a chance of knowing the progress of their old students.

Refresher courses for teachers of great importance especially in the field of basic medical sciences and specialities. These can go a long way in keeping the standards of training at a high level in the various medical colleges. Aid of the W.H.O. and the Indian Council of Medical Research has been very welcome in this connection. At the A.I.I.M.S., for example, during the current year two workshops on Immunology, one on Neuro-diagnostic techniques and a few more are going to be held on teaching methods in Pathology in Biochemistry etc. These are in addition to the routine refresher courses for workers in Reproductive Biology and Mycology etc.

ANNEXURE VI

A note on Medical Education (Undergraduate) in India

INTRODUCTION

Medical Education in India has been in existence for centuries and may be reckoned to date back to the post-vedic period (660 B.C.—200 A.D.). Medicine was a subject of study in the Universities of Taxila and Nalanda, Susruta and Charaka are names known the world over for their contribution to the Indian system of Medicine. Their classic writings are still studied by students of the Indian System of Medicine.

2. DEVELOPMENT OF MEDICAL EDUCATION

The teaching of modern medicine was introduced in India about the middle of the 19th Century with the establishment of the first medical school at Calcutta in 1822. In 1833 the then Governor General appointed a Committee to examine the question of medical education. In 1835 Medical Colleges were started in Madras and Calcutta. A third medical college was established in Bombay in 1845 and Fourth at Lahore (Now in Pakistan) in 1860. With the increasing demand for University education more medical colleges and schools were established in several other provinces and Indian States and in the year 1946, undivided India had 19 medical colleges besides 19 medical schools.

Prior to 1933 the degree of M.B.B.S. awarded by various medical colleges in India was recognised by the General Medical Council of the United Kingdom and the standards were in conformity with those laid down by this Council. In 1933, the Indian Medical Council was established as a statutory body under the Indian Medical Council Act. The original act was repealed and substituted by Indian Medical Council Act, 1956. This Council took over the offices hitherto exercised by the General Medical Council of the United Kingdom. The Council supervises the standards maintained in medical education by periodic inspection of medical colleges and examinations. It makes recommendations regarding curricula, equipment, minimum standards of education and qualifications required of medical teachers.

The Bhoré Committee (1946) recommended that there should be only one standard of medical education and this should be the degree course. The Medical Council of India also recommended the abolition of the licentiate course in Medicine. As a result of this all the medical schools in India were either abolished or upgraded to MBBS standard.

The number of medical colleges in India was 30 in 1951, 41 in 1955, 60 in 1960, 87 in 1965 and 92 to-day (1968). Admission capacity and out turn for the corresponding years are indicated in the following table :—

Year	No. of Medical Colleges	Number admitted	Number passed
1951	30	2489	1696
1955	41	3660	2743
1960	60	5874	3387
1965	87	10520	5387
1968	92	(Information not available at present).	

This phenomenal increase in the number of medical colleges brought various problems in its wake regarding standard of education, shortage of teachers, equipment, high cost of buildings, method of teaching, text books, etc. In order to suggest ways and means to overcome these difficulties, Medical Education Conferences were held in 1955, 1960, 1962 and 1967, in which recommendations were made regarding curriculum, methods of economy in education, meeting of shortage of teachers, orientation of training to meet the present day requirement of the country in the context of Family Planning Programme, etc.

The Health Survey and Planning Committee (Mudaliar Committee) in its report made recommendations for over all health Planning of the country. In order to meet the requirement of trained medical manpower, the Committee recommended the norms of one medical college for every 5 million population and that the ultimate target for trained doctor should be one doctor for every 3500 population. At the end of 1967, the number of medical colleges were 91 with admission capacity of approximately 11,500.

The objectives of our health plans should be :—

- (1) Control of population through Family Planning Programme;
- (2) A National Health Service providing comprehensive health care to the entire population of the country at least by 1981 at the latest;
- (3) The eradication or control of communicable diseases.

In the implementation of these programmes the most important factor to be taken into account is the availability of trained medical and para-medical personnel. The first three plans gave great impetus to the training of doctors with number of doctors estimated at 86,000 at the end of the 3rd plan, the doctor population ratio in 1966 was estimated to be 1:5750, which is a short of the intended goal of 1:3500 recommended by the Mudaliar Committee. To attain this ratio for a population of 598.62 millions, estimated by 1973-74, 1,70,870 doctors will be required. In the present circumstances it will not be possible to meet this requirement. The number of doctors which are expected to be available at the end of 1973-74 will at least be 1,38,825 giving a ratio of 1:4300 approximately.

In order to keep the steady flow of trained doctors, it is proposed to establish 10 new medical colleges with 1500 additional seats during the Fourth Plan to reach an annual admission capacity of about 13,000. The distribution of these colleges is proposed to be such that areas with deficiency will be catered for.

ADMISSIONS

Admissions to medical colleges are governed by the rules and regulations framed for the purpose by the authorities of the colleges concerned and their affiliated universities (Annex. 4). The admissions are made at two different stages i.e. (i) pre-professional or pre-medical in medical colleges in Andhra Pradesh, Mysore, Madras, Pondicherry, Assam, West Bengal and P.W. Medical College, Patna; and (ii) direct to I.M.B.D.S. course in other medical colleges. The Medical Council of India has recommended that no one with less than 45% marks in the qualifying examination should be admitted to medical courses. However, the medical college and universities have varying methods and percentage of marks for admission to respective medical colleges

for example, in Mysore the minimum requirement is 45% marks in qualifying examination, in Andhra Pradesh, it is 50% in science subject, in West Bengal it is 2nd Division, in Madhya Pradesh 45% in qualifying examination, in Madras 50% in science subjects, in Maharashtra, 45% in aggregate, in Kerala 50% in individual science subjects, in Orissa 45% in aggregate, in Rajasthan 48% in aggregate, in Jammu and Kashmir 45% in aggregate, in Goa 45% in aggregate, in Punjab and Himachal 50% in English, Physics, Chemistry and Biology, in Delhi 55% in English, Physics, Chemistry and Biology in All India Institute of Medical Sciences, New Delhi 50% in the entrance test. The methods of selections also vary from college to college. In some colleges, it is by open competition e.g. A.I.I.M.S., New Delhi, JIPMER, Pondicherry, Armed Forces Medical College, Poona etc. In Government Medical Colleges in U.P., a combined competitive test is held for admission from amongst the candidates belonging to the State. In many of the medical colleges admissions are made on the basis of the marks obtained in the qualifying examination.

In some colleges the competition is so keen that even first divisioners are not able to get admission. By way of illustration during 1968 in the Maulana Azad Medical College, New Delhi, about 139 first division applicants could not be admitted. In some places students with 2nd division marks may be able to secure admission.

There is also no uniformity in the declaration of results of Higher Secondary/Pre-medical examination and also in the dates for admission to medical colleges. Observance of uniformity in this behalf was emphasised on various universities more than once through the Inter-University Board but this has so far not had any effect. The standard of marking by different universities also does not appear to be uniform.

There are seats reserved in various institutions for candidates belonging to Scheduled Castes and Tribes with relaxation in minimum requirement for admissions. It has been observed that this concession is not availed of to full extent as in the qualifying examination they are not able to fulfil the minimum requirements for admission. This has come to notice in respect of admissions, in Delhi medical colleges and it is likely that position in other places may not be very different. This would require consideration of some arrangement to give extra coaching to such students in preparatory classes so that they may be able to improve their performance in the qualifying examination, thereby enabling them to fully utilise the places earmarked for them wherever provided.

4. DOMICILE RESTRICTION

Another question in respect of medical education that needs consideration is with regard to domicile restrictions in the matter of admissions to medical colleges in India. These restrictions are prevalent in all institutions except a few like the All India Institute of Medical Sciences, New Delhi, the Lady Harding Medical College, New Delhi, the Jawaharlal Institute of Post-graduate Medical Education and Research, Pondicherry and certain private medical colleges. National integration Council has been stressing time and again that this restriction should be done away with. In order to promote national integration the Central Ministry of Health prepared a scheme for reservation of 10% seats in every medical college for students from other States and award of stipends for that purpose, but this scheme had to be abandoned due to financial and other considerations.

In view of two systems of admissions to medical courses Integrated MBBS and IMBBS interstate admission is not a practicable solution. Further, from experience it has been observed that students who are admitted to medical colleges away from their home town or state later crave for transfer to medical colleges within their state of domicile.

In order to make a beginning in the matter of promotion integration it will be a step in the right direction if admissions in medical colleges in a zone are thrown open to all the candidates belonging to state and Territory comprising that zone. Further it will also be helpful if a student passing

from a University is allowed to apply for admission to medical colleges affiliated to that university irrespective of the State of his/her domicile.

ANNEXURE VII

LIST OF MEDICAL COLLEGES IN INDIA (1969)

Andhra Pradesh

1. Andhra Medical College, Vishakapatnam.
2. Guntur Medical College, Guntur.
3. Kurnool Medical College, Kurnool.
4. Osmania Medical College, Hyderabad.
5. Gandhi Medical College, Hyderabad, Dn.
6. Rangaraya Medical College, Kakinada.
7. Kakatiya Medical College, Warrangal.
8. S. V. Medical College, Tirupati (Chittoor).

Assam

9. Assam Medical College, Dibrugarh.
10. Gauhati Medical College, Gauhati.
11. Medical College, Silchar.

Bihar

12. Prince of Wales Medical College, Patna.
13. Rajindra Medical College, Ranchi.
14. Darbhanga Medical College, Laheriasarai.
15. Medical College, Damodar Road, Sakchi, Jamshedpur.

Gujarat

16. B. J. Medical College, Ahmedabad.
17. Medical College, Baroda.
18. M. P. Shah Medical College, Jamnagar.
19. Municipal Medical College, Ahmedabad.
20. Medical College, Surat.

Haryana

21. Medical College, Rohtak.

Jammu & Kashmir

22. Medical College, Srinagar.

Kerala

23. Medical College, Trivandrum.
24. Medical College, Calicut.
25. Medical College, Kottayam.
26. Medical College, Alleppey.

Madhya Pradesh

27. Medical College, Jabalpur.
28. M.G.M. Medical College, Indore.

29. G. R. Medical College, Gwalior.

30. Gandhi Medical College, Bhopal.

31. Medical College, Rewa.

32. Pandit Jawaharlal Nehru Memorial Medical College, Jaipur.

Madras

33. Medical College, Madras.

34. Stanley Medical College, Madras.

35. Kilpauk Medical College, Kilpauk, Madras-10.

36. Christian Medical College, Vellore.

37. Madurai Medical College, Madurai.

38. Thanjavur Medical College, Thanjavur.

39. Medical College, Tirunuvalli.

40. Medical College, Chingleput.

41. Medical College, Coimbatore.

Maharashtra

42. Grant Medical College, Bombay.

43. Seth G. S. Medical College, Parel, Bombay.

44. Topiwala National Medical College, Bombay.

45. B. J. Medical College, Poona.

46. Medical College, Nagpur.

47. Govt. Medical College, Aurangabad.

48. Armed Forces Medical College, Poona.

49. Medical College, Miraj.

50. Medical College, Sholapur.

51. Medical College, Sion, Bombay.

52. Municipal Medical College, Nagpur.

Mysore

53. Kasturba Medical College, Manipal.

54. Medical College, Mysore.

55. Bangalore Medical College, Bangalore.

56. Karnatak Medical College, Hubli.

57. Medical College, Bellary.

58. St. John's Medical College, Bangalore.

59. Medical College, Gulbarga.

60. Medical College, Belgaum.

61. Medical College, Devangere.

Orissa

62. S. C. B. Medical College, Cuttack.

63. Medical College, Burla, Sambalpur.

64. Medical College, Berhampur, Cuttack.

Punjab

65. Medical College, Amritsar.

66. Christian Medical College, Ludhiana.

67. Govt. Medical College, Patiala.

68. Dayanand Medical College, Ludhiana.

Rajasthan

69. S. M. S. Medical College, Jaipur.

70. Bikaner Medical College, Bikaner.

71. Medical College, Udaipur.

72. Medical College, Ajmer.

73. Medical College, Jodhpur.

Uttar Pradesh

74. K. G. Medical College, Lucknow.

75. Medical College, Agra.

76. G. S. V. M. Medical College, Kanpur.

77. College of Medical Sciences, B.H.U., Varanasi.

78. Motilal Nehru Medical College, Allahabad.

79. Medical College, Muslim University, Aligarh.

80. Medical College, Meerut.

81. Medical College, Jhansi.

West Bengal

82. Medical College, Calcutta.

83. R. G. Kar Medical College, Balagachia Road, Calcutta-1.

84. Calcutta National Medical Institute, 31-Gorachand Road, Calcutta.

85. Nilratna Sircar Medical College, Calcutta.

86. Bankura Sammilani Medical College, Bankura.

87. Medical College, Siliguri.

Delhi

88. Lady Hardinge Medical College. (for women), New Delhi.

89. All India Institute of Medical Sciences, Safderjang (Ansari Nagar), New Delhi-1.

90. Maulana Azad Medical College, New Delhi.

Pondicherry

91. Medical College, Pondicherry.

Goa

92. Medical College, Goa.

Himachal Pradesh

93. Himachal Medical College, Snowdon Hospital, Simla.

ANNEXURE VIII

Statement showing the pre-entrance requirements, methods of selection, minimum percentage of marks in the respective qualifying examinations for admission and status of domiciliary restrictions as applied to various medical colleges in India

State/Name of the college	Pre-entrance requirements for admission to medical Colleges	Method of Selection	Minimum percentage of marks in the respective qualifying examination for admission	State of Domiciliary restrictions as appended to each College
1	2	3	4	5
Andhra Pradesh				
1. Andhra Medical College, Visakhapatnam	Age between 16 to 21 years. In the case of Scheduled Caste/Scheduled Tribes and other backward Classes maximum age limit extended by 3 years. Pass in Pre-University science course examination with Physical Science and Biological science, (ii) Pass in Higher Secondary examination.	+	50 % in aggregate	+
2. Guntur Medical College, Guntur.	Age 17-21 years, Should have passed P.U.C.	Merit	Do.	+
3. Kurnool Medical College, Kurnool.	Completed 16 years of age. Pass in Pre-professional course in Medicine or Inter Science with Physics, Chemistry and Natural Science.	+	Do.	+
4. Osmania Medical College, Hyderabad.	Age not less than 17 years. The candidate should have passed the Pre-university certificate examination or an equivalent thereto recognised by the Govt.	A committee consisting of of Medical College selects. Selection is made on the basis of merit.	Do.	+
5. Gandhi Medical College, Hyderabad.	Age 16 to 21 years, Should have passed the P.U.C. Examination or H. S. C. (M. P.).	Merit	Do.	+
6. Rangarya Medical College, Kakinada.	Completed 16 years of age. Pass in Pre-university examination or Higher Secondary certificate examination or any equivalent examination.	Selection by merit on the basis of marks obtained in the university or Government examination	50 % in aggregate	15 seats are reserved for the candidates sponsored by Govt. of India, Ministry of Health, New Delhi, and selection by DGHS, New Delhi
7. Kakatiya Medical College, Warrangal.	Age 16 to 21 years. The candidate should have passed the pre-university course or Higher Secondary Certificate or senior Cambridge examination or any other examination recognised by the Osmania University.	Merit depending upon the result of the University Examination.	50 % in aggregate	+
8. S.V. Medical College, Tirupati.	Age 16 to 21 years. This age limit is extended by 3 years in case of scheduled castes/ scheduled tribes and the backward classes. Should have passed the P.U.C. exam. or H.S.C. Examination or equivalent examination thereto by the State Government.	+	Do.	+
Assam				
9. Assam Medical College, Dibrugarh.	Age between 17 to 24 years. Should have passed Inter-Science or pre-medical.	The Selection is done on the basis of pre-professional examination.	45% in aggregate	+
10. Gauhati Medical College, Gauhati.	Must attain the age 17 yrs. Should have passed Inter Exam. with science or B. Sc. or any other examination considered equivalent to any other university by Gauhati University, Dibrugarh University.	Selection is done by Selection Board constituted by State Government.	45% in aggregate.	+
11. Medical College, Silchar.	This College is not functioning separately at present and is being run at the Medical College, Gauhati.	+	+	+

1	2	3	4	5
<i>Bihar</i>				
12. P.W. Medical College, Patna.	Must have attained the age of 17 years, should have passed the Inter Science examination or 1st year of the three years degree course with Physics, Chemistry and Biology.		45% in aggregate	+
13. Darbhanga Medical College, Laheriasarai.	Age 17 years. Passed I. Sc. (Biology) B. Sc. (Pt. I.).	+	Do.	+
14. Rajindra Medical College, Ranchi.	Must have attained the age of 17 years. Should have passed B.Sc. Pt. I, with Physics, Chemistry and Biology.	+	Do.	+
15. Medical College, Jamshedpur.	Must have attained the age of 17 years. Should have passed I. Sc. examination with English, Biology, Physics and Chemistry.	Admission on merit subject to such reservation as may be made by the College Governing Council.	Do.	+
<i>Gujarat</i>				
16. B. J. Medical College, Ahmedabad.	Must have completed the age of 17 years. Should have Passed 1st Year B.Sc. Exam.	Selection by merit as on the basis of the marks obtained by the candidates.	Do.	+
17. Medical College, Baroda.	Must have attained the age of 17 years. Should have passed the Pre-medical examination of the M.S. University Baroda.	+	Do.	+
18. M. P. Shah Medical College, Jamnagar.	Must have completed the age of 17 years. Should have passed the Inter-Science examination of the Gujarat University.	A few seats are allotted for the nominees of Central Government and for donors.	Do.	+
19. Municipal Medical College, Ahmedabad.	Must have completed 17 years. Should have passed 1st year of B. Sc. qualifying exam. or equivalent thereto from Gujarat University.	+	50% in Science subjects (Biology Group)	+
20. Medical College, Surat.	Must have attained the age of 17 years. Should have passed the Inter-Science examination or 1st year B.Sc. with Biology Group.	+	45% in aggregate	+
<i>Haryana</i>				
21. Medical College, Rohtak.	Must have attained 17 Yrs. of age. Should have passed the F. Sc. (Med.) or pre-medical exam.	Admission on the basis of marks obtained.	50% in aggregate English & Science subjects (Biology Group)	+
<i>Jammu and Kashmir</i>				
22. Medical College, Srinagar.	Age 17 years. Should have passed the premedical or I. Sc. of J & K University or equivalent thereto.	Selection is done by the Govt. or Board or a commission, appointed by Govt. The candidates so selected are interviewed by the Principal of the College.	45% in aggregate.	+
<i>Kerala</i>				
23. Medical College, Trivandrum.	Must have attained the age of 17 years. Should have passed the I. Sc. (Med.) or B. Sc. (Med.) exam. or pre-professional examination.	+	50% in aggregate	+
24. Medical College, Calicut.	Must have completed the age of 17 years. Should have passed the pre-medical or B. Sc. with medical group.	Admission is purely on merit by a selection Committee Constituted by the Govt.	Do.	+
25. Medical College, Kottayam.	Must have completed the age of 17 years. Should have passed the I. Sc. or B. Sc. examination of Kerala University with Physics, Chemistry and Biology.	+	+	+

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26. Medical College, Alleppy.	Age 17 years, Passed pre-medical or B.Sc.	+	50% in science subject & pass marks in English.	+
<i>Madhya Pradesh</i>				
27. Medical College, Jabalpur.	Must have attained the age of 17 years. Should have passed the 1st Year of 3 years degree course of pre-professional examination or equivalent thereto of any recognised university.	Admission purely on merit on the basis of marks obtained.	45% in aggregate.	+
28. M.G.M. Medical College, Indore.	Must have completed 17 years of age. Should have passed Pt. I.B.Sc. or I. Sc. or equivalent thereto of recognised University.	Admission strictly on merit,	Do.	+
29. G.R. Medical College, Gwalior.	Must have completed the age of 17 years. Should have passed Inter Science. (Medical Group).	Admission on merit on the basis of marks obtained.	Do.	+
30. Gandhi Medical College, Bhopal.	Age 17 years. Upper age limit relaxable upto 5 years in case of S.C./S.T. Must have passed Inter Science. Pre-Professional exam. or part I of the B. Sc. or equivalent thereto by recognised University.	Admission on merit on the basis of marks obtained in Inter Sc. or Pre-professional or Pt. I. B.Sc.	45% in aggregate	Preference for bonafied residence of Madhya Pradesh.
31. Medical College, Rewa	+	+	45% in aggregate	+
32. P.J.N.M. Medical College, Raipur.	Must have completed 17 years. Should have passed the B.Sc. Pt. I or equivalent	Admission on merit.	Do.	+
<i>Madras</i>				
33. Madras Medical College, Madras.	Must have completed 16 years. Should have passed the Pre-University examination with science subjects or B. Sc. passed.	Admission on merit on personal interview and marks obtained in pre-Uni-Examination.	50%	+
34. Stanley Medical College, Madras.	Must have passed Pre-University examination of Madras University or equivalent thereto. Must have completed 15½ years.		Do.	+
35. Kilpauk Medical College, Madras	Must have completed 16 years of age. Should have passed pre-University examination of Madras University or equivalent thereto.	Admission on interview basis.	45% in aggregate.	+
36. Christian Medical College, Vellore.	Age above 15 years and 8 months. Should have passed pre-University or I.Sc. or Higher Secondary Examination of Madras University securing eligibility to degree course offering physical and natural sciences or any other equivalent examination.	+	50 % in aggregate.	+
37. Madurai Medical College, Madurai.	Must have attained 17 years of age. Should have passed Pre-University certificate.	Admission based on open competition and personal interview held by Committee approved by the Government.	50% in aggregate.	+
38. Thanjavur Medical College, Thanjavur.	Must have completed 15 years of age. Should have passed pre-Univer. certificate examination of Madras University as requirement thereto or any other recognised university.	Admission by a Selection Committee approved by the Govt. of Madras.	Do.	+
39. Medical College, Tirunelvalli.	+	+	50%	+
40. Medical College, Chingleput.	+	+	50%	+
41. Medical College, Coimbatore.	+	+	Do.	+
<i>Maharashtra</i>				
42. Grant Medical College, Bombay.	Must have completed 17 years of age. Should have passed Inter Science Group 'B' Examination.	Admission on merit basis	45% in aggregate.	+
43. Seth G. S. Medical College, Parel, Bombay	Must have attained 17 years of age. Should have passed Inter Sc. 'B' group.	Admission on merit on the basis of marks obtained.	Do.	+
44. T. N. Medical College, Bombay.	1. Must have completed 17 years. 2. Should have passed Inter Sc. (Group B) Exam. of the University of Bombay.	+	Do.	+
45. B. J. Medical College, Poona.	Must have completed 17 years. Should have passed Pre-Professional (Medicine) Examination of Poona University I.Sc. 'B' Group or any equivalent examination of any other University. in Physics, Chemistry and Biology.	Admission on merit basis on the basis of marks in Sc. subject and extra-curricular activities i. e. Inter-Collegiate sports, N. C.C, etc.	45% in aggregate.	+

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46. Medical College Nagpur.	Must have completed 17 years of age. Should have passed B. Sc. (Pt. I) Exam. with additional physics of any recognised University.	On Merit basis.	Do.	+
47. Government Medical College, Aurangabad.	Must have completed 17 years of age. Should have passed B. Sc. 1st year Biology.	Admission on merit on the basis of the marks obtained and due credit is given to NCC and games and Sports activities at the time of selection.	Do.	+
48. Armed Forces Medical College, Poona.	Age 17 to 21 years. should have passed pre-Degree Intermediate.	Admission by a selection team by a competitive examination.	50% in English, Physics, Chemistry & Biology.	+
49. Medical College, Miraj.	Must have completed 17 years of age. Should have passed the Pre-Professional Science (Medicine) Examination.	On merit basis on marks obtained in Sc. subjects and activities carried out in sports, NCC at the time of selection.	50% in English, Physics Chemistry and Biology.	+
50. Medical College, Sholapur.	Must have completed 17 years of age. Should have passed inter-Sc. (Group B) or pre-professional (Group B) Exam. of any recognised university.	Admission on merit on the basis of marks obtained.	45% in aggregate.	+
51. Medical College, Sion, Bombay.	-/-	+	Do.	+
52. Municipal Medical College, Nagpur.	+	+	Do.	+
53. Kasturba Medical College, Manipal.	Must have completed 17 years of age. Should have passed pre-professional course in Medicine.	Admission on merit on the basis of written test & interview.	Do.	+
54. Medical College, Mysore.	Must have completed 16 years of age. Should have passed pre-university certificate examination for pre-professional course leading to MBBS degree.	Admission on merit with some seats reserved for S.C./S.T.	45% in aggregate.	+
55. Bangalore Medical College, Bangalore.	Must have completed 16 years of age. Should have passed the pre-university certificate or any other recognised Univ. with Physics, Chemistry & Biology.	Selection on the basis of marks.	Do.	+
56. Karnatak Medical College, Hubli.	Should have completed 16 years of age. Should have passed the P.U.C. with Physics, Chemistry, Biology or Sc. Graduate with above subjects.	Admission on the basis of interview.	Do.	+
57. Medical College, Bellary.	Must have completed 16 years of age. Should have passed the Pre-Univ. course in medicine.	+	Do.	+
58. St. John's Medical College, Bangalore.	Must have completed 17 years of age. Should have passed Pre-Prof. course in medicine.	+	50% in aggregate.	+
59. Medical College, Gulbarga.	Must have completed 16 years of age. Should have passed pre-Univ. certificate Sc. or pre-prof. exam.	Admission on merit basis of the previous examination.	40% in aggregate.	+
60. Medical College, Belgaum.	Must have completed 17 years of age. Should have passed B. Sc. (Pt. I) or equivalent.	+	+	+
61. Medical College Devanagere.	16 years age + passed university Course Examination.	+	45% in aggregate.	+
<i>Orissa</i>				
62. S.C.B. Medical College, Cuttack.	Must have attained the age of 17 years. Should have passed I. Sc. Exam. of Utkal Univ. or Pre-Prof. of Utkal Univ. or any exam. recognised as equivalent thereto with Physics, Chemistry & Biology.	By merit on the basis of marks obtained. Selection by selection Board appointed by the Govt. Addl. credit will be given to:— (i) Inter University/ State Sports. (ii) B.Sc. qualified. (iii) Children of Defence Service Personnel.	+	+
63. Medical College, Burla, Sambalpur.	Must have attained the age of 17 years. Should have passed I. Sc. of Utkal Univ. of Pre-Professional.	Admission on merit basis.	45% in aggregate.	+
64. Medical College, Berhampur.	Must have attained the age of 17 years. Should have passed the I. Sc. Exam. with Physics, Chemistry, and Biology, or Pre-Prof. course examination.	Admission on results of Univ. Exam. is granted by provisional selection board headed by the Principal & Professors of S.C.B. Medical College, Cuttack.	+	+

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<i>Punjab</i>				
65. Medical College, Amritsar.	Must have attained the age of 17 years. Should have passed F. Sc. (Med.) or pre-med. exam. of any recognised University.	+	50% in aggregate	+
66. Christian Medical College, Ludhiana.	Must have attained the age of 17 years. Should have passed F. Sc. or I. Sc. of any recognised University.	+	Do. (Eng. & Sc. sub.)	+
67. Govt. Medical College, Patiala.	Must have attained the age of 17 years. Should have passed F. Sc. (Med.) or pre-Medical, Examination.	By merit on the basis of marks obtained.	Do.	+
68. Dayanand Medical College, Ludhiana.	+	+	50% in Engl, Physics, Chem. & Bio-	logy.
<i>Rajasthan</i>				
69. S.M.S. Medical College, Jaipur	Age 17 to 21 years, Should have passed the I.Sc. or Ist year Univ. Exam. of 3 years course.	By merit on the basis of marks obtained.	48% in aggregate	+
70. Bikaner Medical College Bikaner.	Age 17 to 21 years. Should have passed the 1st Year. of 3 years degree course or I. Sc. or B.Sc. with Medical Group.	Admission on merit on the basis of marks obtained.	Do.	+
71. Medical College, Udaipur.	Age 17 Years. Should have passed I. Sc. or Pre-Medl. or Ist Year of 3 Yr. degree course.	+	Do.	+
72. Medical College, Ajmer.	+	+	Do.	+
73. Medical College, Jodhpur.	+	+	Do.	+
<i>Uttar Pradesh</i>				
74. K.G. Medical College, Lucknow.	Must have completed 17 years of age. Should have passed I. Sc. with Biology.	Admission by merit based on competitive written test conducted by the College.	45% in Aggregate	+
75. Medical College. Agra	Must have attained the age of 17 Yrs. Should have passed I. Sc. (Medical) or equivalent exam. passed.	Admission is granted on a pre-Medical Exam. conducted each year. in physics, Chemistry and Botany & Zoology.	Do.	+
76. G.S.V.M. Medical College, Kanpur.	Must have attained the age of 17 years. Should have passed I. Sc. Exam. with Biology from any recognised University.	Admission by competitive Exam. known as Pre-Medical test.	45% in aggregate	+
77. College of Medical Sciences, B.H.U., Varanasi.	Must have attained the age of 17 Yrs. Should have passed I. Sc. or Pre-Prof. or an equivalent thereto of any recognised Univ. with English Physics, Chemistry & Biology.	Admission by Pre-medical test conducted by Banaras Hindu University.	50% in aggregate.	+
78. M.N. Medical College, Allahabad.	Must have attained the age of 17 yrs. should have Passed I. Sc. with Biology.	Selection is based on written competition.	45% in aggregate	+
79. Medical College, Muslim Univ. Aligarh.	Must have attained the age of 17 Yrs. Should have passed I. Sc. with Phy., Chem. & Biology or an equivalent exam. recognised by Aligarh Univ.	By merit based on written competitive Exam. test conducted by Aligarh Muslim Univ.	40% in aggregate	+
80. Medical College Meerut.	+	+	45% in aggregate.	+
81. Medical College, Jhansi.	+	+	+	+
<i>West Bengal</i>				
82. Medical College, Calcutta.	Age between 17 to 21 years. Should have passed I. Sc. /Pre-Medical exam. or an equivalent exam. of a recognised University.	+	50 % in Aggr.	Admission in restricted to students who are permanent residents or domiciled in W. B.
83. R. G. Kar Medical College, Calcutta.	Must have attained the age of 17 Yrs. Should have passed I. Sc. or Pre-Medical exam. with Physics, Chem. and Biology.	Selection on the basis of Univ. results & other tests.	Do.	+
84. N.R. Sircar Medical College, Calcutta.	Age 17-21 years. Should have passed I. Sc. or Pre-Med. of any recognised Univ. with Biology as one of the subjects.	Do.	Admission purely merit.	+
85. Calcutta National Medical Instt. Calcutta.	Must have attained the age of 17 years. should have passed I. Sc. or Pre-Med. exam. of any recognised University.	+	Do.	+
86. Mankura Medical College, Bankura.	Must have completed the age of 17 Yrs. Should have passed Pre-Med. or I Sc. with Biology as one of the subjects from any recognised University.	+	45% in aggregate in Eng. and Sc. Subjects. (Biology group)	+

1	2	3	4	5
<i>Delhi</i>				
87. Lady Hardinge Medical College, New Delhi (for women).	Must have completed 17 Years. of age. Should have passed I. Sc. or F. Sc. or Pre-Med. exam. of the University recognised by Delhi Univ. with Physics, Chemistry, Biology & English.	+	55% in English and Sc. subjects. (Biology group)	+
88. All India Institute of Medical Sciences, New Delhi.	Must have attained the age of 17 Years. Should have passed I. Sc. or an equivalent exam. of recognised Indian Univ. with English, Biology, Physics, Chemistry or passed Pre-Medical or Pre- Prof. exam. or integrated MBBS with English, Physics Chemistry, Biology after passing Higher Secondary or Pre-Univ. or an equivalent examination.	Selection by merit on the basis of competitive examination.	50% in aggregate in Intermediate Medical group.	Out of 50 seats 10 for S. C./S.T. & 5 for foreign candidates; & remaining 35 by merit.
89. Maulana Azad Medical College, New Delhi.	Must have completed the age of 17 Years. Should have passed the Pre-Med. or I. Sc. or equivalent exam. from a recognised University.	+	55% in aggregate in Eng. & Sc. subjects (Biology group)	The admission is restricted to (i) Residents of Delhi including displaced persons registered in Delhi. (ii) Sons/daughters and persons wholly dependent on Central Govt. servants posted in Delhi at the time of admission and sons and daughters and persons wholly dependent on M. Ps. (iii) Sons/daughters of Central Govt. servants posted in Indian Mission abroad (iv) sons/daughters of residents of Union Territories in the country (v) Central Scholars Colombo Scholars & candidates from J. & K.
<i>Pondicherry.</i>				
90. Medical College, Pondicherry.	Must have attained the age of 16 Years. Should have passed Pt. II of the Baccalaureat Degree of the recognised French Institution or Pre-Univ. with Med. group of Subjects under Group 'A' of Madras Univ. or any other Univ. recognised as equivalent thereto by Madras University.	Admission on merit on the basis of marks obtained.	50% and above in aggregate.	
<i>Goa</i>				
91. Medical College, Goa.	Must have attained the age of 17 Years. Should have passed I. Sc. Examination.	Admission strictly on merit.	45% in Sc. Subjects in I. Sc. exam.	+
<i>Himachal Pradesh</i>				
92. Himachal Medical College Simla.	Age 17 Years, passed pre-medical or F. Sc. in Medical Group.	+	45% in English Physics, Chemistry- and Biology.	+

NOTES:—+ Information not available.

ANNEXURE IX

Extracts from the Report of the Royal Commission on
Medical Education (1963—68)THE UNDERGRADUATE MEDICAL COURSE
PURPOSE AND OBJECTIVES

196. The basic attraction of medicine for the young student is the opportunity it offers him of serving humanity in any one of many ways, for example by helping the sick or infirm, in advancing medical science by research or by improving the organisation of medical care. The fundamental problem in devising any medical course is to provide some means of accommodating these different aspirations within a single educational framework. For close on a hundred years the undergraduate medical course has consisted essentially of a pre-clinical course devoted to the study of anatomy, physiology and what is now called biochemistry, followed by a course of clinical instruction which includes, in addition, such para-clinical subjects as pathology and microbiology. With the enormous expansion in medical and scientific knowledge during the past thirty years or so, demands have inevitably come for the introduction of new subjects and the expansion of the old without any increase in the time allowed to complete the curriculum. As a result, medical courses have become so congested and excessively factual in content that their educational value is open to question.

197. We cannot emphasize too strongly that the undergraduate course in medicine should be primarily educational. Its object is to produce not a fully qualified doctor, but an educated man who will become fully qualified by postgraduate training. This does not mean that we think the vocational aspect of undergraduate medical education should be ignored; the student clearly has a professional career in view and his education must be based in this direction. Our view in this respect corresponds with that expressed by the Robbins Committee when discussing higher education in general:

"We deceive ourselves if we claim that more than a small fraction of students in institutions of higher education would be where they are if there were no significance for their future careers in what they hear and read; and it is a mistake to suppose that there is anything discreditable in this. Certainly this was not the attitude of the past, the ancient universities of Europe were founded to promote the training of the clergy, doctors and lawyers; and though at times there may have been many who attended for the pursuit of pure knowledge or of pleasure, they must surely have been a minority. And it must be recognised that in our own times, progress and particularly the maintenance of a competitive position depends to a much greater extent than ever before on skills demanding special training. A good general education, valuable though it may be, is frequently less than we need to solve many of our most pressing problems.

"But, while emphasising that there is no betrayal of values when institutions of higher education teach what will be of some practical use, we must postulate that what is taught should be taught in such a way as to promote the general powers of the mind. The aim should be to produce not mere specialists but rather cultivated men and women. And it is the distinguishing characteristic of a healthy higher education that, even where it is concerned with practical techniques, it imparts them on a plane of generality that makes possible their application to many problems—to find the one in the many, the general characteristic in the collection of particulars. It is this that the world of affairs demands of the world of learning. And it is this, and not in conformity with traditional categories, that furnishes the criterion of what institutions of higher education may properly teach".

198. That the traditional undergraduate medical curriculum is unsatisfactory is now widely recognised; most medical schools have recently embarked on its modification in a variety of ways. The driving force in some at least of these experiments has been a desire to find a method of meeting in one course the differing needs and interests of students. Many of our witnesses have expressed deep concern about the problem of educating students for such differing careers as general practice, specialist practice in medicine or surgery, and psychiatry. Some have even suggested that the only solution is to adopt two entirely different training courses with different entry qualifications, one heavily scientific and the other, with only a minimum of scientific content, aimed at the production of general practitioners. We do not accept this view; In other fields, such as engineering or chemistry, education at first degree level in different specialised branches (e.g. civil or

electrical engineering, physical or organic chemistry) differs only in the options taken, usually in the later stages of the course there is a basic core common to all branches. Medical education should, we believe, follow a similar pattern, but use being made of alternative options to satisfy the different needs of individual students.

199. In the undergraduate curriculum far too little attention has generally been paid hitherto to the study of the behavioural sciences (psychology, sociology and related disciplines) and their application to medical care. An essential part of a medical student's education is learning how to treat human beings in trouble, to gain their confidence and to understand the psychological and social background to their physical problems; in his profession he will often be called upon to make judgments on evidence which, without such understanding would be inadequate. Much of this the student will learn in the course of early clinical practice but his learning will be easier, quicker and more successful if he has had a proper introduction to the study of individual and social behaviour. A knowledge of the behavioural sciences is also, of course, a prerequisite for the study and practice of psychiatry.

200. We take the view, therefore, that the aim of medical education should be to produce, at graduation, a person with two essential qualifications. He should have, first, a knowledge of the medical and behavioural sciences sufficient for him to understand the scientific basis of his profession and to permit him to go forward with medicine as it develops further; and, secondly a general introduction to clinical method and patient care in the main branches of medicine and surgery, together with an introduction to social and preventive medicine. We hope that he will be taught throughout in such a way as to inculcate in him a desire to continue learning not only during the postgraduate training which we hope he will undertake (see chapter 3), but throughout his professional life. In the light of these considerations and of the evidence we have received we have sought to establish a basis on which an undergraduate medical school can with the guidance of the General Medical Council, devise an appropriate curriculum.

STRUCTURE OF THE CURRICULUM

201. The medical curriculum has traditionally been divided into two more or less self-contained stages. The preclinical stage usually lasts five or six university terms and is devoted mainly to the teaching of medical sciences including particularly anatomy, physiology and biochemistry; when covering six terms, it includes some instruction in paraclinical subjects such as pathology, microbiology and pharmacology. The clinical stage, usually lasting about three years, includes instruction in paraclinical subjects, but is mainly devoted to teaching the application of the medical sciences to the practice of clinical medicine; the teaching is illustrated by, and often based substantially upon, experience in the care of patients. The two stage, usually lasting about three years, includes instruction the student's viewpoint the division is exaggerated by the Second Professional Examination (familiarily known as the "2nd M.B.") in anatomy, physiology and biochemistry, which he must pass at the end of the preclinical course. Clinicians argue that not enough weight is given to clinical aspects of the medical sciences, while teachers of the preclinical subjects claim with equal force that their task is to give solid grounding in science leaving its clinical application until later. Many students allege that the preclinical subjects as taught to them appear to have so little relevance to practical medicine that they find the early part of their course discouraging and their interest is aroused only when they reach the clinical stage. No doubt all of these views have some validity. Efforts are now being made in many schools, in different ways, to effect a better integration of the curriculum. In the initial phase of any medical course the scientific basis must be laid for an understanding of structure and function in man before intensive clinical work can be undertaken, but unfortunately this has led to a widespread impression that the course consists of two discrete parts. The continued use of the terms "preclinical" and "clinical" serves to heighten and perpetuate this impression. We should prefer to see these terms no longer applied to subjects and parts of the medical curriculum; we think they are bound to lose their significance as the curriculum becomes better integrated. Their use is so widespread and well established, however, that they are likely to remain for some time; we employ them frequently in this Report as a matter of convenience, although we regard the undergraduate medical course as a single whole and would prefer it to be described simply as made up of education in a variety of clinical and non-clinical subjects.

202. The relationship between the clinical and nonclinical aspects of the undergraduate course, and the extent to which the two aspects should be integrated have been argued at great length in all countries with an advanced standard of medical education; the arguments are familiar to those who are concerned with the planning of medical courses, and we need not discuss them in detail. Most medical students are interested primarily in learning how to alleviate human suffering, and in any subject the good teacher constantly strives to relate his teaching to the interests of the student; moreover, a careful planned relationship between instruction in the clinical and non-clinical aspects of the course would reduce the unnecessary duplication and the inconsistencies of emphasis, which have often characterized the traditional pattern of teaching. If, however, the medical sciences were to be taught solely or mainly in relation to diseases of human beings students could not in our view, be given a broad foundation of scientific knowledge or a real understanding of scientific method and principles; nor could teachers be attracted with the interest in scientific research and in the deeper study of their subject, which is essential if the advancement of the medical sciences is to continue. We think that as a good working rule the main responsibility for the organisation and content of teaching in any preclinical subject should rest with a teacher whose main interest and activities lie in the advancement of the subject itself, rather than in its application to the practice of medicine. We hope, however, that the problem of finding a satisfactory relationship between the different aspects of the course will not be exaggerated, for it is becoming to some extent unreal. Preclinical teachers are progressively introducing clinical illustrations into their teaching. Clinicians for their part, have in recent years become increasingly interested in the scientific aspects of their work and have an invaluable contribution to make, not only in maintaining the interest of the preclinical student and constantly reminding him of the clinical relevance of the medical sciences, but also in keeping other teachers in touch with the needs of practical medicine. In any case, an increasing proportion of medical graduates whose abilities fit them for teaching has in recent years been attracted into clinical work; unless the pre-clinical sciences are to be taught almost entirely by non-medical scientists (which would be undesirable) an increasing proportion of the teaching in these subjects must be done by teachers actively engaged in their clinical application. We discuss later (paras 216, 228 and 233) some possibilities of carrying the process of integration still further without losing sight of the essential difference of emphasis between learning scientific methods and principles and applying them in the service of medicine. If this distinction is observed, every encouragement should be given to experiments with different forms and degrees of integration, in the realisation that no single pattern of teaching is likely to be equally satisfactory for all schools, all teachers or indeed all students.

203. The more diversity there is in the curriculum pattern, and particularly in the relationship between the non-clinical and clinical elements, the more difficult students will find in moving from one medical school to another during their course. The majority of medical students in this country remain at one medical school for the whole of their course. The need for major increase in the output of doctors (see Chapter 6) will require the retention of a non-clinical school at St. Andrews and probably, in our view, the provision of pre-clinical courses in some other universities which cannot themselves offer facilities for clinical education but can arrange for their students to proceed for this purpose to an established medical school, preferably nearby (see paras 377 and 380). The number of students involved will be relatively small, however, especially when Oxford's new teaching hospital is built and if undergraduate clinical teaching is established at Cambridge (see para 379); the whole structure of undergraduate medical education cannot and ought not to remain rigidly divided for the convenience of students who have to move during their course. The problems of transferring from one medical school to another will be greatly eased if the flexible type of medical curriculum we propose later in this chapter is generally adopted, but we think the best solution is for "separate" preclinical schools to develop close links with, and as far as possible model their courses on, those of the university to which they expect most of their graduates will go for their clinical education.

LENGTH OF THE MEDICAL COURSE

204. For most students the medical degree course at a university lasts about five years, without counting the pre-medical courses offered at many English universities and the Scottish "first year" which fulfils the same function (see paras

311-312). A substantial minority of students take an additional year in order to gain, as well as a medical degree, a degree in one of the medical sciences. Such students may either take a full three-year Honours course instead of the usual preclinical course, as has been traditional at Oxford and Cambridge, or interrelate a year's additional study of a single scientific subject between the preclinical and clinical stages; other possibilities have been introduced in recent years, particularly at some Scottish universities. During the clinical stage of the course English medical schools allow students much shorter holidays than the normal university vacations, and clinical students at Scottish medical schools tend to spend a great part of their vacations in acquiring clinical experience in hospitals. After graduation at least a further year must be spent in approved training posts before full registration for professional practice can be granted. There are many complaints that the time taken to graduate is too long, and a number of witnesses have suggested that the course should be reduced by at least a year, both in the national interest (to increase the supply of doctors and reduce the cost of educating them) and in the interests of students—many of whom it is said, do not really begin to learn effectively until they have the opportunity to exercise some professional responsibility.

205. As has been emphasised above, the essential object of the undergraduate course is to educate the student to university degree standard both in the medical sciences and in the application of these sciences to human diseases. This is a formidable task which nobody could expect to be completed in the three years at present accepted (though not without reservation by many people) as adequate for a first degree course in most "non-Vocational" subjects. Conceivably, it could be accomplished in four years, but a close examination of the curriculum makes this possibility very doubtful. Practically all our witnesses have accepted that in the preclinical stage the student should have a reasonable grounding not only in the traditional medical sciences, but also in a variety of other subjects whose importance has been recognised in more recent times, particularly psychology sociology, statistics and genetics. Provision must also be made for at least an introduction to para-clinical subjects such as general pathology and pharmacology in addition to the clinical side of the curriculum. No doubt some of the traditional content of the preclinical curriculum can be removed without great loss. Anatomy is the subject in which a reduction is most often advocated, a considerable amount of time could be freed for other subjects if detailed dissection were reduced, as is discussed later in this chapter. Even if advantage were taken of all possible opportunities of rationalising the teaching of preclinical and paraclinical subjects, however, we cannot see how a medical school could in two years provide instruction in all the subjects now recognised as necessary, let alone present them in such a way that the student really obtained a proper grounding in, and appreciation of, the scientific basis of medicine. A lengthening of the preclinical and paraclinical aspects of his education appears to be inevitable.

206. The clinical side of the course has also become overcrowded and indigestible, in view of a great many teachers. The growth of knowledge, the increase in specialities all of which want to be substantially represented in the course, and especially the traditional aim of producing a man trained for general practice in the old sense—capable of doing almost everything and hence having had some contact with almost everything—have led to an attempt to achieve an impossible breadth of coverage. We have seen evidence, however, that students are not always as busy as the curriculum would imply and that for them clinical part of the course is often a rather leisurely business, or at the most, an alternation of intensive work with spells of boredom and inactivity*. This appears to be largely due, however, to a lack of good organisation we discuss this problem in Chapter 10. Several medical schools have been able by planning the first two clinical years carefully, to devote the final year almost entirely to supervised experience rather than to organised instruction. We believe that this is an entirely proper development; as we indicated earlier, the undergraduate course must be selective, and its aim should be to produce the basic material from which the practising doctor can be fashioned. In our view, strictly vocational training should come after graduation. We have proposed in Chapter 3 a scheme of postgraduate professional training which includes an initial year of general clinical experience under close university supervision, followed by a series of training appointments intended to provide the young doctor with the clinical experience he needs before he can be expected to exercise independent clinical judgment. In view of these proposals, we think the undergraduate clinical course should be remodelled and reduced in length; we would not suggest,

*Evidence of Professor J. Anderson and Appendix 19, Section B III(e)

however, that anything less than two years would be adequate for the purpose.

207. Given, then, that with the standards and levels of study commonly accepted at present more than two years are required for the preclinical and general paraclinical elements of the course, and that at least two years are required for the clinical side, we are faced with a need for a total length of over four years at the very minimum. In fact we think that, irrespective of the arrangement of the preclinical, paraclinical and clinical elements, an undergraduate could not possibly be given in less than five years the kind of education that we consider appropriate for a university degree in medicine in modern circumstances. As will be seen later, we are not advocating that all students should spend three years studying preclinical and paraclinical subjects followed by two years in clinical medicine; but we believe that a course of five years is required to provide a proper grounding in the essential subjects with which all prospective doctors need to be acquainted, and also to allow some opportunity for study in greater depth or breadth according to the individual students' inclinations and capacities.

208. During this period of five years the total duration of clinical study and the sequence of clinical and non-clinical subjects, might vary between schools and between students within any one school. All students should, however, be given an introduction to the incidence of disease in the community at the beginning of the course (see paras 218 and 258). Those who choose to study in clinical subjects at an early stage (see paras. 216 and 233) must be given at an appropriately early point the introduction which all students must have to elementary clinical method. The patterns of medical course available in each school should be decided by an interdepartmental committee of teachers appointed by the faculty of medicine. The members of this committee should include junior staff who should be in close touch with student opinion and should plan ways and means of assessing results.

THE PRECLINICAL STAGE

The concept of human biology

209. In examining the possible make up of the preclinical element in a course of the kind discussed in the preceding paragraphs, we have been particularly interested in the numerous proposals which have been put forward in the past few years based upon a three-year degree course in human biology. Many universities either propose to institute courses of human biology or profess to be teaching human biology already. In addition, several medical schools provide courses which though not so described, can in some respects be classified as courses in human biology.

210. The papers of the Working Parties on a School of Medicine and Human biology represent the first fully argued case for founding medical education upon a degree course in human biology. The Working Parties define the subject only by implication, but their concept of it (they point out that there could be several others) includes the elements of the subjects already in the conventional preclinical course, together with psychology, genetics, statistics and sociology; moreover, they recommend bringing forward into the preclinical years subjects, like epidemiology and microbiology, which are often taught only to clinical students. The Working Parties envisage that the course would be suitable for students other than those intending to become doctors, and medical students might in fact form only a minority of those taking it; the third year of the proposed course offers a variety of elective subjects which would go some way towards providing for the different future needs of students.

211. The term human biology as used in the documents of the Working Parties is clear enough, but elsewhere it has no settled meaning. Some appear to think its purpose would be fulfilled by a rather orthodox combined pre-medical and preclinical course with the addition of some psychology and social science; others regard it as one ingredient of a pre-clinical course, of the same standing as genetics or statistics. We prefer to think of human biology in much broader terms; it should surely embrace the origin, evolution and geographical development of mankind; the growth of human populations and their structure in space and time; human development and heredity. The properties of the human genetic system and the nature and import of the inborn differences between individuals. In this wider conception, human biology should include human ecology and physiology and many of the aspects of human behaviour that are the concern of sociology and cultural anthropology—among them, for example, the history and significance of family life, love, play and aggression. Finally, human biology should include an account of the

nature, origin and development of communication between human beings and the non-genetical system of heredity founded upon it. No existing or planned course of human biology has such a broad syllabus, although most contain some elements of it.

212. Human biology thus defined could make a very good degree course without necessarily being a suitable preparation for a medical career. We do not think it could be criticised as having the character of a "soft option", a course founded largely on genetics population dynamics and statistics would probably be more exacting in point of intellectual efforts than anything that came after it. It will not provide a deep enough foundation for basic medical research, the future practitioners of which will still have to take degree courses in microbiology, biochemistry, physiology etc. unless they take such courses for a further year or two at (MSc, level after their first degree in human biology; this is not an insuperable objection, however see para 224). The main difficulties in using it as an introduction to medicine are, first, that its appeal is too general and impersonal for a career in a profession that is centred on the treatment of individuals—it may not gratify the particular vocational urges that lead people to a medical career and, secondly that it being made suitable for people who are not going to be doctors it becomes proportionately less suitable for people who are going to be doctors.

A Flexible course structure

213. Although we think a course in human biology could not in a single form be simultaneously suited to the needs of medical and of non-medical students there are several ways in which the human biology concept could in our view, be adapted so that a substantial part of course suitable for those intending to study medicine might be common also to those aiming at, say paramedical and social work. In particular the idea of a medical course whose initial stages would be common to university preparation for other careers has much to be commended. Such a course would, for example, enable the final choice of medicine to be deferred until the student had had some experience of university life; a number of students who enter other faculties and cannot transfer because of the rigidity of present courses, might then be attracted into medicine.

214. A course offering perhaps two years of subjects common to all students, with a division thereafter it to medical and non-medical streams which would follow different options in the third year of study, would represent a considerable advance on the traditional course structure. Even more flexibility seems desirable however, most students entering medical faculties have already decided on a career in medicine, they differ widely in their particular career intentions (e.g.) general practice, surgery, medical research)†. We believe that a more flexible course can be devised which will not only provide the essential background to the clinical aspects of medical education, but will also justify the award of a degree in medical science; some universities in Britain are already working out proposals on these lines. We have in mind a modular structure like that of many university courses in the United States. The course would be built up of self-contained modules, each of which would represent a specified proportion of a year's work (either in an individual subject or in a combination of subjects on a single theme) and would count as an agreed number of course-units. Award of the degree in medical science would depend on satisfactory completion of modules carrying credit for course-units equivalent to three years' work. The educational environment need not always be the laboratory or class room of the traditional preclinical sciences; we hope students will increasingly be able to undertake in a social or clinical context the kind of rigorous study that has hitherto been thought possible only in such subjects as anatomy physiology and biochemistry. In assessing requirements for the medical science degree, credit should be given for any relevant work a student may have done in another faculty (e.g. dentistry) before entering upon the medical course.

215. In order to ensure an adequate and orderly coverage of the essentials the choice of subjects open to the student would need to be controlled to some extent; a prescribed number of course-units would have to be gained in specified subjects or in specified combinations of subjects. For example the student might be required to gain a certain number of units in the essentials of anatomy and physiology, but in one school he might meet this requirement by taking separate

*School of Medicine and Human Biology: Reports of the working parties, Research Publications, London, 1963.

†See Appendix 19, Table 5C.

modules in each subject while another might require him to take modules to an equivalent total value in which both subjects were combined. In addition to these compulsory subjects there would be a group of modules designed to carry the course forward in fields regarded in general as desirable for all students but with some individual choice among small ranges of alternatives. For example, all students might be thought to need instruction, beyond that which was given in the compulsory subjects, in the general field of the behaviour sciences; they might, however, be offered the choice of additional module in psychology or sociology. Similarly all students might be required to take some instruction in clinical science and offered a choice, for example, between clinical pharmacology and clinical physiology.

Finally, the student would be required to gain a number of units in modules chosen from a wide range of options according to the inclination and interest of the individual. Viewed in this way the course qualifying for the degree in medical science would consist of three elements; a group of compulsory subjects, a group of limited alternatives, and a group of options (equivalent to less than one year's work in all) in which a large measure of choice would be open to the student to pursue his special interests.

216. The timing and order in which modules of all three kinds were taken should be open to adjustment to some extent to suit the needs of the individual student as seen by himself and his tutorial adviser. Some witnesses have suggested for example, that the average school leaver in this country is not sufficiently mature to face a course in human anatomy; we are far from convinced that this is so, but the course structure we have suggested would allow the student's introduction to anatomy to be delayed, if this were desired until late in the first year or even until the second year of study. Moreover a student whose individual interests lay in some clinical aspect of the medical sciences should be allowed to select alternatives or options which he might be able to take only after an appropriate period of clinical instruction. Thus while many students would meet the requirements for a medical science degree by the end of their first three years, others might not complete them until a later stage—in some instances perhaps not until after they had finished the clinical part of the course.

217. In the application of these principles to the construction of practical medical curricula certain points should be kept in mind. First, optional modules available in the earliest stages of the course should if possible include short intensive periods of instruction in the traditional pre-medical subjects and mathematics. Students who had not previously taken one of these subjects to the level required for the proper understanding of the medical sciences based upon it could thus fill the gap in their background; less time would then be available to them for other optional work at a later stage, but such a drawback cannot be avoided in some cases if entry requirements are to be broadened as they should be (see paras. 304-310).

218. Secondly, the clinical aspects of medicine should be introduced into the course, at an early stage, as we have outlined in paragraph 208, but we do not believe that any one way of doing this has yet proved wholly satisfactory; we think further experimentation is needed. In addition the non-clinical subjects should, where appropriate be illustrated with examples of their clinical application. Some instruction in elementary clinical method should be compulsory, for all students before they begin their main period of clinical study. Apart from organised instruction, opportunities should continue to be provided, perhaps in the vacations, for students to observe clinical work in hospital.

219. Thirdly, the optional modules available should be such as to permit a student either to extend the range of his knowledge by studying more than one subject or to go more deeply into a particular subject. These alternatives are necessary if the course is to meet the needs of the future general practitioner or hospital specialist as well as those of the potential teacher or research worker. Optional study has traditionally been regarded as something extra, to be taken by only a small proportion of undergraduates and has usually taken the form of an intensive study of a single science subject for one or even two years. Recently as interest has grown in the advantages of introducing elective studies of shorter duration within the main body of the course there has been often an implicit assumption that the object is to enable the student to study a clinical subject, or one of the medical

sciences, in depth. Certainly a student should have the opportunity to do this, and to take part in research, if he so wishes; the value of contact with research is very great and is not measured by the magnitude of the project or the importance of the results achieved. But the student should equally have the opportunity to extend the breadth of his education. Each university should make available to students its full resources in medical and related subjects so that they may prepare themselves for developments (e.g. the use of computers) which have not yet established themselves as standard features of a medical curriculum.

220. We have satisfied ourselves that a flexible modular curriculum of the kind we have suggested, offering a wide choice of subjects, would be a practical proposition for a reasonably well equipped and organised medical school. Such a course should not make much greater demands than does the traditional course on staff and accommodation which, as we point out in paragraphs 397 and 398, will in any case have to be greatly expanded. Classes will be larger with the bigger student entry which we recommend in Chapter 7 for the medical schools of the future, but at least some of the new and optional subjects will be common to students of more than one faculty. Similarly, although time table difficulties are likely to be great, they will probably be less acute than might be expected. Experience of optional courses in other fields suggests that each year's student intake will divide itself, in fairly constant proportions, into groups each following a well-established course arrangement and that students taking other combinations will be comparatively rare. Moreover unless medical curriculum is planned with the flexibility available through a modular system we do not see how they can be appropriate to the needs of the students from different backgrounds, and to the increasing diversity of the medical profession. The traditional rigid curriculum, well as it may have served medicine in the past, is no longer adequate.

221. We have had considerable doubt whether to put forward a specimen curriculum, because at least some people would probably regard it as a recommended course, whereas we wish above all to encourage free experimentation within the principle which we have suggested. In Appendix 8 we offer examples which should be regarded as no more than illustrations of the practicability of our proposals in terms of an actual curriculum.

222. Although subjects are shown separately in the outline curricula in Appendix 8, teaching time and the planning and conduct of all parts of the course should be in the hands of the faculty as a whole; individual departments might have a substantial control over the teaching of optional subjects, but there should always be opportunity for work which would cut across departmental boundaries. There should be no more than about two hours of formal lecturing in any one teaching day, and at least one hour should be used for seminars; the remainder of each day being taken up by practical work, demonstrations, discussions and reading. The student must be taught to use a library and explore original literature for himself. Whenever possible the teaching of each department should be concentrated into a single day, or two days, in each week, so that the staff can be freed for research and other work during the remainder of the week.

THE MEDICAL SCIENCE DEGREE

223. The award of a degree in medical science would not be an essential part of a medical course of the kind we propose; each university would decide whether such a degree should be offered. We urge, however, that a degree in medical science should be generally offered, for two important reasons. First, most students in other faculties obtain a degree after three years of study and thereafter have the status of graduate students; this distinction will be the more irksome to medical students as the number of their contemporaries pursuing human biology courses, which will be much in common with medical courses, increases. Secondly, if a student failed for any reason to complete the full medical course he could have a qualification which would enable him to take up a career in some non-medical or paramedical field.

224. The degree given after a course of the type we have outlined would presumably be that of Bachelor of Medical Science if the present tendency towards discontinuing the differentiation of science degrees prevails. We think that universities would normally recognise it as an Honours degree, classified according to the standard reached by the individual student over the whole of his performance. Most universities

might wish to offer a Pass degree to students whose work, although satisfactory, did not justify the award of Honours. The Honours degree of which we are speaking would not, of course, be equivalent to a specialised Honours degree in a particular subject, e.g. physiology. The few medical students who felt impelled to reach the standard of a specialised Honours degree would probably need to spend a further year devoted to the study of that subject alone. We do not regard this as an objection, however, there is no reason why the medical course should offer a short cut to a specialised science degree for which it is not intended as a preparation. The broad medical science course should be adequate to meet the non-clinical requirements of all medical students (and, with some small modification, of dental students also). The Medical Research Council and other witnesses have told us that in their opinion the traditional inter-related course in, for example, Biochemistry or physiology, can no longer provide even a good student with a complete preparation for an academic career in these subjects. A student aiming at such a career would not normally rest content with a first degree but would go on to take a higher degree in the subject of his main interest.

THE CLINICAL STAGE

225. The clinical part of the undergraduate medical course had formerly to be used for vocational training; this allowed no opportunity to extend the benefits, of the students preceding education in the sciences basic to medicine. The situation was improved in 1953 (see para. 60) by legislation debarring medical graduates from registration until they had held approved house appointments for a year. The recommendations we have made in Chapter 3 for post-graduate education and training should, if accepted, release medical schools from any remaining thought that they need produce a graduate fit to practise medicine independently; the undergraduate clinical years can then be regarded solely as part of a basic university education in medicine. This is one of the main arguments which has persuaded us on educational grounds to recommend (see para. 206) that the minimum period of clinical studies be reduced.

226. The aims of the clinical stage of the undergraduate course should be:—

- to demonstrate the application of the medical and behavioural sciences to the practice of medicine, thus giving the student an appreciation of the biological, environmental and personal factors which underlie structural disease and disturbances of function; to review the phenomena of disease and the present state of knowledge about their prevention and management and to indicate the direction of likely advances in the future;

- to provide a sound basis in clinical methodology which should include not only the medical interview and clinical examination but also the use and interpretation of the many physical and chemical procedures which are essential parts of routine clinical investigation and which must be adequately covered to ensure future clinical competence;

- to introduce the student to the principle on which treatment is based;

- to encourage a holistic attitude towards patients and avoid the increasing danger considering them as cases rather than persons;

- to ensure that the student has assimilated the ethos of medicine.

227. Objectives such as these have been hard to achieve hitherto, particularly because the curriculum has attempted too much and has therefore become unnecessarily diverse, congested and disconnected. Moreover, the examination system has tended to test the student's capacity to reproduce material learned from textbooks or lectures rather than his capacity to discriminate. The need for exposing medical students separately to each one of an increasing number of clinical specialities can be removed by adequate postgraduate professional training such as we have proposed in Chapter 3; the clinical curriculum can then be selective, as it should be. The examination system must be radically altered (our proposals on this are put forward in paras. 283-286 so that the student is himself encouraged to bring together and integrate the instruction he receives and will come to visualise the patient as a whole not merely as a collection of systems.

Collaboration in teaching will, however, be the most effective way of removing some of the problems which have arisen from the allocation of time to each discipline separately, the failure to present health and disease in man as a whole, and the excessive use of the formal lecture and of the old-fashioned type of "open ward round". The distinction between "medical cases" and "surgical cases" exists only for convenience of treatment and does not apply in the study of disease. Experience has shown that when surgeons and physicians work closely in partnership spectacular advances can be made; this partnership has important lessons for the medical student in emphasising the unity of clinical method and medical knowledge and in demonstrating that the practice of medicine today has become a matter of team-work. Some collaborative methods of teaching such as the clinico-pathological conference, the clinicopharmacological conference and the seminar are well established; newer methods include integrated teaching, topic teaching and group clinical teaching.

228. Much interest has been aroused by the pioneering work of a number of United States Universities (notably Western Reserve University) on the integration of medical courses, and recently experiments in this field have been introduced at several British medical schools. In these experiments the clinical course is integrated in the sense that the student, already introduced to the medical and behavioural sciences in his earlier years of study, has an opportunity to meet them again in relation to specific clinical problems and in the light of all the relevant clinical investigations. Thus, when he is studying heart disease the student will be able to revise and add to his knowledge of the anatomy of the heart and the physiology of cardiac movements, along with the pathology, the clinical features the cardiography, the catheter studies the radiological investigation and perhaps the surgical operation. In this way, and to a lesser extent by topic teaching, the most obscure and difficult problems of the preclinical subjects be given a real significance. The integrated approach to medical education has obvious advantages; it helps the student to understand the relevance, to his objective of becoming a doctor, of all he has to learn; it breaks down the artificial barriers still existing between medicine, surgery and other related disciplines; it provokes thought on new-teaching methods, for integration implies full use of interdepartmental teaching of every kind and of the widest variety of methods; it requires staff, when necessary, to defend their views against those of their colleagues in front of students and this in itself promotes an atmosphere of critical curiosity; members of the integrated teaching team become increasingly aware of the educational objectives and methods of the medical school, time is saved by the reduction of unnecessary repetition. The system is admittedly expensive in staff time and could be difficult to implement in medical schools in which consultant teachers who have much to offer, are heavily committed outside the teaching centre; we recommend in Chapter 10, however, that Consultant teachers in major specialities should be appointed on the basis of at least eight half-day sessions a week, and should be given facilities for "geographically full-time" service. The extent to which, and the form in which, integrated teaching is introduced must be decided by each medical school. The planning of integrated teaching is far from easy, but the planning of medical education need not and cannot any longer be left to individual heads of departments; each medical school will require a comprehensive educational policy planned and continuously reviewed by the interdepartmental committee of teachers to which we refer in paragraph 208.

229. Group teaching has a particular place at ward level where the patient, the best focus for integration, is studied. In this form of teaching the students, instead of spending a period in say—surgical unit followed by a similar period in a medical unit, are attached in small numbers to groups of teachers, such a group might include a surgeon, a physician, a pathologist, a radiologist (undergraduates should always be taught radiology by a specialist in this subject), a general practitioner and a psychiatrist and be supplemented as necessary by others (for example, a dermatologist, a specialist in geriatrics or an ophthalmologist). The aim of the teaching group is to ensure that the students are properly educated in the fundamentals of clinical methodology and see a wide range of clinical and investigative work during a part of the whole of the clinical stage.

230. These various forms of formally organised teaching will not by themselves be sufficient as an introduction to the

care of patients. A special feature of medical education in Britain, particularly developed in London, has been clinical clerking, the attachment of a small group of students to a "firm" so that they may learn by sharing in the day-to-day care of patients over the whole period of admission. Although students can no longer play as important a part in medical care as they did in the past this system of attachment to and regular attendance upon particular patients, as members of the team responsible for them, is still most valuable. It offers opportunities, especially in regard to the inculcation of attitudes, that cannot be so well proved in any other way. It can be applied equally successfully to outpatient departments, of which more use should be made to allow students to share in the care of patients, and less for demonstration purposes. Clinical clerking can be interposed between periods of integrated teaching or continued synchronously with it, but there is special value in a intensive, even if short, period of clerking during which the student is free of other commitments. The principles of group clinical teaching can be effectively applied to clerking.

231. We recommend that the clinical stage contain an elective period of, say, ten weeks. This is not a new proposal, but the value of elective periods has tended to be greatly reduced because they are often followed by major examinations. The changes which we envisage in the examination system (paras. 283 and 284) will free the elective period from this disadvantage and allow it to become a valuable educational experience. The student should be able to choose from a wide variety of elective topics, subject to the approval of the teaching committee (see para 208).

232. Group teaching and the various forms of inter-departmental teaching described above, together with clinical clerking, should give the student a broad coverage of medicine in its widest sense by the time he graduates, and should remove the artificial distinctions between "medicine" and "surgery". Specialists in gynaecology, ophthalmology, otorhinolaryngology, radiology, radiotherapy, venereal diseases and many other fields will have been represented in the course; in this way the teachers of these subjects, which we believe have their major place in postgraduate professional training, will have had an opportunity to interest students in their disciplines. Similarly general practice, psychiatry and emergency services will all have played their parts in this collaborative teaching: we think, however, that the group of subjects, with the addition of obstetrics, has a special educational value: we suggest that specified periods of time, as thought fit by each faculty of medicine, should be allotted to them although they too will have their major place in the post-graduate period. We believe that the way in which each of these subjects is treated should be left to the individual medical school; we wish to encourage a variety of approaches. For example, in relation to general practice the student will have the benefit of group teaching might follow allotted patients from the outpatient department through the hospital and back to the home might be attached to a general practitioner (preferably by way of a health centre) and might decide to use his elective period in this speciality. A period of residence in hospital at some stage in the undergraduate course is most valuable.

233. In discussing the preclinical stage we suggested (para. 216) that although most students would meet the medical science degree requirements by three years' continuous work others might wish to meet part of these requirements by suitable work in a clinical subject at a later stage. Many subjects would be suitable for this purpose including, for example, clinical biochemistry, clinical physiology, endocrinology, metabolic disease, psychiatry, or any clinical discipline approved by the faculty of medicine; a list of approved subjects, which would vary with local facilities should be compiled by each teaching committee (see para 208). The sequence of topics in integrated teaching should be arranged so that a student electing to follow this plan could leave and later rejoin the class without disadvantage; in our view this is largely a matter of time tabling.

234. Authoritarian teaching had an important place when medical knowledge was largely of an empirical nature, and when used regularly it discourages initiative, curiosity and the growth of the student's critical faculty and his ability to learn for himself. We recommend a considerable reduction in formal teaching, but lectures are helpful in initiating the student to clinical medicine: without some facts he cannot be expected to understand or to question. Later, an occa-

sional lecture by a distinguished teacher has special value. An expert lecture can bring him audience to a mood of rapt attention and lead them from an elementary beginning through increasingly intricate argument to a full understanding; he can arouse their enthusiasm in a way that no writer can ever hope to do. There is also a place for occasional lectures which give the student an insight into the latest research activities of the teaching departments.

SPECIMEN OUTLINE CURRICULUM

235. Our intention has not been to set out a rigid curriculum but rather to indicate guidelines which permit flexibility; we expect and welcome experiment by individual medical schools. Nevertheless, as with the preclinical aspects of the course, we have satisfied ourselves that our recommendations can be translated into practicable timetable terms. We have seen no need to put forward a detailed timetable, which might be used to inhibit the freedom of thought and action we wish to encourage at each medical school, but the outline below shows how a two-year clinical curriculum might be planned, on the assumption, that teaching takes place in 46 weeks of the year. The time allotted does not total 92 weeks and our outline implies no attempt to fill each day. The time we have left free will inevitably be occupied, however, we hope by attendance at seminars and clinicolaboratory conferences and particularly by additional work on subjects appropriate to each student's inclination and aptitude.

		Approximate duration
Integrated teaching (see para. 228)	Concurrently 2-3 hours a day for each or in block periods.	50 weeks
Group clinical teaching and clinical clerking.		
Paediatrics, medical and surgical in collaboration (see para. 276).	Perhaps 4-8 weeks each (duration would be specified by the teaching committee).	30 weeks.
Obstetrics & gynaecology (see paras. 273-275).		
Psychiatry (paras. 263-272).		
General practice (paras. 277-279).		
Community medicine (paras. 280-282).		
Emergency Practice.		
Elective topic		10 weeks

PARTICULAR SUBJECTS

236. The design of each medical school's curriculum will, of course, depend very much on the views taken in the school as to the content and aim of teaching in particular subjects. Medical schools should be left free to choose for themselves, under the guidance of the General Medical Council, the place that should be given to each subject in the light of local circumstances, national needs and developments in medicine, from time to time. Without any desire to impose a standard approach, we wish to offer some comments on certain subjects which, either because their traditional place in the medical curriculum is widely questioned or because they have not yet established a firm place in the curriculum, must be subject to a great deal of discussion when specific plans are being worked out.

ANATOMY AND PHYSIOLOGY

237. The teaching of anatomy has been a matter of controversy in recent years. Each medical school must have its own views on this, and indeed so much has been said and written in recent years against the teaching of excessive anatomical details that we hardly need discuss this aspect of the matter. Few witnesses have maintained that the undergraduate medical student should dissect the whole body in detail; even surgeons, who have a special interest in ensuring that medical students have a thorough knowledge of the structure of the body, have assured us that the traditional pre-clinical emphasis on topographical detail in anatomy is not necessary at the undergraduate stage.

238. The teaching of anatomy has in fact already changed to a considerable extent. We were told by the Anatomical Society of Great Britain and Ireland that the detailed study of the structure of the human body—usually carried out mainly by laborious dissection of preserved bodies—which used to be the main activity of anatomy departments is now supplemented in all British medical schools by instruction on a wide range of topics including histology, neuro-anatomy and aspects of endocrinology, embryology and reproductive physiology as major items of the curriculum, and sometimes including also allied fields such as physical anthropology, biomechanics, genetics and cytology. Some medical schools require only one part—either head and neck, thorax and abdomen, or extremities to be dissected in detail and make extensive use of prepared specimens and visual aids to demonstrate the structure of other parts and organs. In others, however a great deal of dissection is still required, and we have the impression that even where drastic cuts have been made in that proportion of time allowed for anatomy in the preclinical course there has not always been a corresponding reduction in the amount of work expected of the student. Moreover, there are disturbing signs that even in medical schools where considerable thought has been given to bringing the teaching of anatomy into line with present-day ideas, substantial duplication continues between the anatomical and physiological and some times the biochemical-parts of the course. Students who experience the instruction as it is and not necessarily as the more enlightened of their teachers wish or even believed it to be, have told us repeatedly of the frustrating and profitless duplication in the lectures they receive—sometimes on the same day—from representatives of different departments. The repetition of important material is not always undesirable and the presentation of a topic from different points of view may be very helpful to the student. These aims can be better achieved, however, within a framework of cooperation between departments which extends to the content of individual teaching sessions. In view of the Anatomical Society, the present divisions between the main preclinical subjects are a matter of teaching convenience rather than of fundamental differences. We should like to see an approach to the teaching of human structure and function on a genuinely cooperative basis, and have therefore made provision in our illustrative curricula (see App. 8) for modules of instruction in "Human Anatomy and Physiology" as a combined subject, though we recognise of course that students with special interest in one aspect rather than the other should have an opportunity to pursue it in a more intensive form.

239. The need for special dissecting rooms, and for means of storing and disposing of preserved bodies and tissue, makes the provision of accommodation for preclinical teaching in anatomy awkward and expensive. The approach suggested above, together with a reduction of dissection to the absolute minimum, might reduce the sale on which these special facilities need to be provided. We think some experiments on these lines should be carried out if successful, they would open up the possibility that a single type of general-purpose laboratory could play an important part in preclinical teaching in anatomy as well as in physiology, biochemistry and pharmacology. We are not entirely convinced of the advantages of the multipurpose laboratories which have been introduced in some countries unless such laboratories are associated with a radically new approach to preclinical teaching they seem likely to present as many problems—though of a different nature as do laboratories of the traditional type.

STATISTICS

240. "The purpose of teaching statistics to medical students is not to produce statisticians, any more than the purpose of teaching biochemistry is to produce biochemists; it is to help doctors to think quantitatively."* The teaching of statistics can contribute to the education of medical undergraduates in two main ways. First, the subject is an integral part of the logic of scientific method and can be conveniently used to introduce ideas about making and interpreting observations and about experimentation. Secondly, statistics comprises a body of techniques for the measurement and assessment of variation used widely and increasingly in medical research on diagnostic procedure, effectiveness of treatment, development of new drugs, causative factors in disease, laboratory measure-

ment and many other subjects. Some knowledge of the principles of the statistical approach is now necessary so that doctors can make some judgement for themselves of the validity of the claims for medical advances made in journal and other communications. Instruction in statistics is a necessary part of the process of producing a graduate who can apply a scientific outlook to his future experience.

241. Medical students often find statistics difficult and are not always convinced of the value of the subject for their purpose.* Some of their difficulties are real, for the basic logic of probability assessment is often unfamiliar to medical students and cannot be understood without time and thought. On the other hand unnecessary problems have sometimes been created by a sterile emphasis on algebraic and arithmetical manipulations which have little relation to the principles or practice of medical applications. The educational value of statistics can only be realised, in our view, by concentration on its function in the assessment of medical evidence. The technical mathematical apparatus of calculation must, like many other techniques, be taken on trust by most students. Teaching should not be confined to vital statistics, which in some medical schools was the only branch of the subject taught until recently. Moreover, statistics is not computing; its part in the course is not dependent on development in the use of high-speed electronic computers for medical purposes. Such developments demand special and separate instruction. A knowledge of statistical principles will, however, be very important in framing questions to put to computers, and in interpreting the answers.

242. The length and content of the teaching to be given in statistics must be decided by each medical school. The problems which require statistical treatment should be seen by the student to arise naturally from the study of health and disease, but he cannot be introduced to more than a fraction of the applications of statistical methods in medicine and in the biological sciences; suitable opportunities occur at many points in the curriculum and much will depend on the interests of individual teachers. Instruction can perhaps best be divided into three stages. First, the basic principles of statistical logic and methods should be taught within a reasonably compact period, preferably after the student has gained a good knowledge of the medical sciences and their methods. The aim should be to introduce the ideas of measurement in medicine and interpretation of biological observations; there are advantages in using a title which conveys this aim, rather than "statistics". Examples should be based on human variables and drawn from other subjects which are being studied at the same time, e.g. physiology or biochemistry. The emphasis throughout should be on the meaning of results rather than on formal calculations, but experience in handling data is important in order to stress that the purpose of statistical methods is to draw quantitative conclusions from real observations. If time is available (perhaps in an optional module) some instruction can be added on the planning of experiments and surveys and on the maintenance and uses of medical records. More than half of the time devoted to basic teaching in statistics should be spent on practical and tutorial work, preferably in small groups.

243. The second stage of instruction in statistics should consist of several carefully-prepared sessions of joint teaching, mainly but not exclusively with clinical department spent in discussing the statistical aspects of a medical problem which comes into the curriculum of the department concerned. The statistician must collaborate closely with the staff of the other departments and must become familiar with their teaching and the medical implications of the problems discussed. Several different topics, occupying short periods, are preferably to a single extended project. Examples of possible topics are testing of drugs, adverse reaction to drugs, bio-assay, clinical signs and diagnosis, surveys of community health, social factors in disease (smoking and lung cancer or bronchitis), growth of micro-organisms, cell counts and variations in human diet.

244. The third stage should introduce the student to vital statistics, which is concerned with a particular field of medical study rather than with the general logic of quantitative assessment. The topic is best included in community medicine, (see paras. 280-282) and should cover mortality and morbidity measurement, with an introduction to the life table. A short account of problems of population growth should be given preferably in conjunction with instruction in family planning.

*Evidence of the Society for Social Medicine.
British Journal of Social and Preventive
Medicine, October, 1966, Vol. 20, No. 4, p. 153.

*See appendix 19, Section B, III (a)

245. An adequately staffed department or sub-department of statistics is desirable within each medical school, but first class medical statisticians are scarce. The teacher should have had some experience of modern research on the applications of statistics in some field of medicine. He will then not be limited in his scope either to normal arithmetical manipulations which are of no interest to the typical medical student, or to practical but out-moded techniques. If a competent teacher with such experience is found there is no need to lay down rules about whether his degree should be in medicine, mathematics, or indeed any other subject, or whether he should be located in any particular department.

BEHAVIOURAL SCIENCES

246. In 1957 General Medical Council suggested that in the undergraduate medical course "instruction should be given in the elements of normal psychology". The corresponding passage in the Council's recommendations ten years later reads;

"In the Council's view the study of human structure and function should be combined with the study of human behaviour. The Council considers that instruction should be given in those aspects of the behavioural sciences which are relevant to the study of man as an organism adapting to his social and psychological, no less than to his physical, environment. Instruction in the biological and sociological basis of human behaviour, normal emotional and intellectual growth and the principles of learning theory should be included"

The difference between these two statements is evidence of an increasing concern by the Council with the contribution which the behavioural sciences should be making to medical education; it reflects as steadily growing appreciation by doctors of the importance of psychological and social factors both in illness itself and in their relationships with their patients. Many witnesses have drawn our attention to the need for systematic education and training in this field—usually with reference to general practice, but often in relating to the needs of hospital doctors of all kinds, and of course, particularly as a foundation for the later training of specialists in psychiatry. Witnesses have pointed especially to the increasing frustration and distaction of many general practitioners at their inability to deal with the substantial proportion of patients whose difficulties are psychological or social in origin, and to the alleged inability of many specialists to regard the patient as a person rather than as a case of particular disease. There can be no doubt that the teaching normally provided by British medical schools in this field is in need of great improvement.

247. The efforts made at present to teach the behavioural sciences during the preclinical stage are very diverse.* They vary from almost nothing to substantial courses covering a wide range of topics in normal and abnormal psychology; few schools as yet offer any organised instruction in sociology. In many instances most of the teaching is provided by psychiatrists, and in some others by non-medical staff employed in departments of psychiatry; geologists on the one hand and sociologists on the other, are some times brought in to provide some connection between the individual and his environment in nature and society; sometimes a department of social medicine will offer a review of community factors relevant to medicine, but often this department will make its contribution during the clinical stage. Students have commented repeatedly to us on the inadequacy of the teaching they get in this field. They have emphasised that instruction focussed upon basic psychological functions, to the exclusion of recognisable human, behaviour, is irrelevant to their interests; on the other hand, a dogmatic exposition of psycho-analytic concepts of the kind that has been encountered in some medical schools in the United States has no place in a scientifically-oriented education.

248. By and large, current teaching in the behavioural sciences to medical students is sketchy, either too lightly or too heavily influenced by clinical interests and poorly related—

if at all—either to the other preclinical sciences or to normal human behaviour as experienced by the student. These defects are partly due to the relative newness of the behavioural sciences as organised disciplines, especially in British universities; departments of psychology and sociology present a wide variety of individual interests, but seem seldom to have developed to the point of being able to offer a strong comprehensive coverage of their respective fields. In psychology particularly, the approach of many academic teachers to their subject has offered little of the practical interest which is essential if it is to be attractive and useful to the medical student; in very many cases the teachers' natural wish to arrive at scientifically verifiable facts has led them to focus their attention on laboratory processes rather than on real life, and on the relative simplicity of the rat rather than on the complexities of the human being. Apart from these background difficulties social science faculties have been put under considerable strain by the major part they have played in the general expansion of universities over the past ten years which has given them more than enough problems of organisation and teaching within their own field without going out of their way to find others outside it. Finally, the development of these subjects in relation to medicine has been particularly hindered by the absence of a body of teachers with both a full academic training in the behavioural sciences and a qualification in medicine; by contrast, the existence in the traditional preclinical sciences of teachers with both scientific and medical qualifications has been a powerful influence in the development of the contribution of these sciences to medical education.

249. In these circumstances medical schools which take seriously the need to introduce teaching in behavioural science into their curricula have inevitably been tempted to fall back upon their own clinical staff—whose interests naturally lie mainly in the direction of clinical psychiatry and social medicine or to recruit their own sociologists and psychologists who would provide for the needs of their students as the medical schools saw them. If medical schools expand on the scale we envisage later in this report, there will be further pressures for developments of this kind. The burden of teaching a large medical class cannot be taken by other faculties in their stride, and there could be proposals for building up departments of medical psychology and medical sociology within medical schools if their counterparts already established in other faculties were unable or unwilling to meet the needs of the medical students. We should regard such proposals with considerable concern. The clinical side of medical school can often with advantage include departments or units concerned with the clinical aspects and applications of medical sciences (see para 430.) but the main teaching of any science—physical, biological or social—should be carried out in close contact with the main stream of scientific interest within the university; otherwise it is bound to be self-defeating, even if carried out on a fairly large scale. Medical Schools cannot hope to provide within their own resources first-class departments in all the subjects which are now becoming recognised as desirable in the medical course; moreover, the establishment of rival departments one teaching the general aspects of the subject and the other its medical applications, could seriously impede the general development of those subjects. Teaching in the behavioural sciences, as in the other newer subjects of the medical curriculum, must therefore in our view be a fully cooperative endeavour between the medical and other faculties involved.

250. Cooperation must be based, first on a firm definition of the needs of the medical student, which itself must be arrived at cooperatively. The medical schools cannot hope for effective collaboration by laying down their requirements and expecting others to meet them without question. On the other hand, if, as we think must be accepted, the needs of medical schools are to be reflected in a substantial increase of staffing and other resources in other faculties, the medical schools have a right to expect that their interests should be taken fully into account in the instruction provided. There will probably be a considerable measure of common ground between the instruction they need and that generally given to students in behavioural science departments; we think that as a matter of principle the instruction given to medical students in these subjects should be of the same standard and require the same intellectual effort—though of course within a more restricted field—as that normally offered by the departments concerned.

251. Through out the teaching in behavioural science there should be a strong emphasis upon the methods by which data

*Recommendations as to the Medical Curriculum, p. 10. General Medical Council 1957.

**Recommendations as to Basic Medical Education p. 15. General Medical Council, 1967.

*CARSTAIRS, G.M., et al. . . . Surgery of Undergraduate Psychiatry teaching in the United Kingdom, 1966-67. British Journal of Psychiatry (awaiting publication).

are obtained in psychology and sociology. This will demonstrate that human behaviour and social institutions can be investigated by the established methods of science; that the techniques of observation and measurement in these sciences yield data whose reliability and validity can be systematically appraised, and that concepts and theories about human behaviour can and must be submitted to empirical verification. As in the biological sciences, the student will be taught how to evaluate evidence in this field, so that in his future reading he can distinguish between unverified assertion and theories which have been tested by systematic observations.

252. Since both psychology and sociology are large and growing subjects, the topics to be covered must be chosen carefully. In psychology, for example, special attention should be paid to the interaction of heredity and environment in the development of human personality, and to the range of individual differences in psychological functions and how these differences can be measured. Appendix 10 gives a list of topics which might appropriately be covered: in treating each of them the teacher should give illustrations of research findings which have confirmed or modified existing explanatory theories.

253. In addition to this teaching about essential psychological processes, psychologists should participate in some aspects of the physiology course (e.g. the neuroendocrine system) in order to discuss the biological processes underlying emotion, memory and thinking. Similarly psychologists can usefully contribute to instruction in pharmacology when the psychotropic drugs are being discussed.

254. All students should be taught to recognise the effect of their own behaviour upon other people and should be given some understanding of social skills, some help in developing them and some practice in their application; all this would be directly useful in the clinical part of their course as well as in later life.

255. Throughout the teaching of psychology, illustrations should be given of disturbances of the process under discussion (e.g. failure of recent memory, disturbance of mood, effects of drugs), the resources of clinical teaching departments being drawn upon for this purpose. We suggest, however, that systematic teaching in abnormal psychology, on the psychological effects of illness and on doctor-patient relationships, can best be given at the clinical stage, when the student can see for himself what it is all about.

256. The method of teaching in psychology is, in our view, almost as important as its content. When classes are large there is difficulty in organising discussion groups, demonstrations and practical sessions for small number of students but this kind of teaching is essential if medical students are to arrive at any real understanding and acceptance of the psychological aspects of human behaviour; the implications for staffing must be faced.

257. In the introduction of sociology, social administration and related subjects into the undergraduate medical course there are serious dangers—as there are in all disciplines—of teaching too much, too formally and too disconnectedly. The teacher should not view the medical student as a potential medical sociologist or social worker but should try, in cooperation with his colleagues, to “give the student a comprehensive understanding of man in health and in sickness and an intimate acquaintance with his physical and social environment”.*

258. Three requirements seem implicit in the acceptance of this objective. The first is that students should be provided during their first year—preferably in their first and/or second terms—with a historical and comparative introduction to the medical needs of society and the role of the doctor and other health workers. Secondly teaching and the selection of topics in sociology and related disciplines should, as far as possible, be relevant to medicine; deliberate and sustained efforts should be made to show students the relevance of social phenomena, whether treated conceptually, comparatively or historically, to the roles and functions in society of doctors and of organisations for medical care. Although students must learn how to use a library and how to reach selectively in broader fields, they should not be expected to piece together fragments of knowledge, research method and techniques. The instruction provided for medical students by sociologists and social administrators should therefore be specifically adapted

to the needs of the students. @Thirdly, teaching in the social aspects of medicine should, as the God Enough Committee emphasised, “be integrated with the clinical work of the student during the undergraduate course and the intern year. The student has to be made aware in the hospital ward and in the home, as well as in the classroom, why patients and families behave as they do in situations of illness; of the social and cultural factors which influence of the patients’ expectations and response; of the problems for doctor, patient and family in the management of illness and handicap in the community; of the social, ethnic, occupational and psychological forces which can hinder prevention and treatment; and of the difficulties of communications, and other problems which arise from established expectations about the way a person in a defined situation will behave, particularly in hospital. There is no single way of achieving this aim@@ Sociologists, social workers, hospital clinicians, general practitioners, social administrators, social medicine and public health staff and others, all have an integrative contribution to make at different stages in the curriculum. Some examples of the topics which relate teaching in these fields to medical care are listed in Appendix 11, though here again, there is need for much experimentation.

259. The object of instruction in sociology and related fields should be two-fold; first to contribute to the medical student’s general education by showing him that the social environment of his own up-bringing is only one facet of the complex society in which he lives and will have to work; and secondly to introduce him to the methods of sociological observation and analysis, to the nature of sociological theories about rules governing group behaviour, and to empirical research designed to test such theories. In the early years of the undergraduate course the emphasis should be on basic sociological and epidemiological concepts, using illustration which show the bearing of social factors on disease and on its prevention and cure; more detailed consideration of the medical profession itself, and of the organisation and administration of medical care can more appropriately be provided later (to some extent during professional training), possibly in association with students of social administration.

260. There are certain matters of general social interest on which, to quote from evidence we have received, “the doctor is still considered to be an ‘oracle’ and the student should recognise the responsibility this entails”. We do not think medical education should encourage the doctor to assume an authority beyond that implied by his profession or his responsibilities as a citizen. We recognise, however, that there are many important matters of moral and social controversy in which doctors inevitably become involved: abortion, drug addiction and artificial prolongation of life are examples. No doctor, however, remote from clinical practice, can detach himself entirely from such questions and we agree that the student needs help in preparing to deal with them. To some extent, of course, the answer lies in the process of general education through which every university student must pass; his constant interaction with other young people of different backgrounds, beliefs and aspirations is in itself a means of developing a personal philosophy which will enable him to deal with these issues. We hope that the broader course of undergraduate education that we recommend will help by bringing the medical student into close contact with his contemporaries and seniors in other fields, in place of the segregation characteristic of some medical schools hitherto. Whatever his philosophy, it should of course be based on an informed understanding of the facts of the situation; this is more important for medical students than for many others, since they will often find themselves in later life in a position of having to stand by their beliefs publicly in the face of ignorant and irrational pressure. The instruction in psychology, sociology and social medicine that we suggest will in our view provide as much in this respect as can reasonably be expected: the medical course cannot in itself do more than make available the facts on which the student must form his own moral and social judgments. Advocates of particular views should make their own arrangements to put their ideas before the student;

Students, *Lancet*, 1967, ii, 411.

*Report of the Interdepartmental Committee on Medical Schools, pp. 169-170. H.M. S.O., 1944.

@See MARTIN, F.M., McPHERSON, F.M. and MAYO, P.R., A course in Physiology and Sociology for Medical

@@Evidence from the society for social Medicine (see footnote on p. 102 above) and other.

*Recommendation as to Basic Medical Education p. 9, General Medical Council, 1967.

we have no reason to think that they are denied adequate opportunity of doing so.

SEX EDUCATION

261. Many medical schools still offer little or no instruction about sexual behaviour and its disorders. This is a serious omission, and we see no reason why it should not be immediately rectified. There are two aspects of sex education in medical schools. The first arises from the need to dispel individual ignorance and misunderstanding among medical students, as among other university students and indeed all young people. Some member of the staff, perhaps a member of the student health staff, should accept the duty of giving instruction of this kind. The second aspect of sex education applies specifically to medical students because doctors are frequently consulted about problems of sexual development in childhood and adolescence, about sexual difficulties in marriage and about sexual deviation. Particularly when there is very widespread public discussion of these matters, doctors should be able to treat them with informed understanding. The biological aspects of sex and reproduction can appropriately be included in the teaching of human anatomy and physiology; likewise, in the teaching of behavioural science, consideration should be given to normal sexual development and the interpersonal and social aspects of sexual behaviour.

262. The treatment of major sexual deviation must remain the concern of the specialist in this field, but every doctor is likely to meet with occasions when he can detect, and may be able to relieve, a patient's anxiety about real or imagined sexual abnormality. An important part of clinical education in this field lies in the future doctor's learning how to help his patients to overcome the embarrassment which often makes it difficult for them to disclose their sexual problems. The doctor can help them in this respect only when he has overcome his own embarrassment; the discussion of case material in small mixed student groups can be very useful for this purpose. Helpful contributions on the clinical aspects of sexual behaviour may be made during teaching in gynaecology, general practice and psychiatry.

PSYCHIATRY

263. We have repeatedly emphasised that the object of the undergraduate medical course is education and not vocational training; any doctor who remains ignorant of human psychology (both normal and abnormal) must be considered ill-educated, however, thoroughly he may be trained in his chosen speciality, because this subject permeates the whole of medical practice. We have been dismayed to find how inadequate is the present provision for the teaching of psychiatry in most undergraduate medical schools* and we think every effort should now be made to remedy this (see para 126). Every undergraduate medical school should have a chair of psychiatry, and its associated hospitals should have the facilities and staff needed for a full range of teaching in this subject.

264. In the past students have experienced considerable difficulty over their instruction in psychiatry. Each major subject of the curriculum has required them to recognise new phenomena and to acquire a new vocabulary; but the pattern of objective observation, and more or less precise quantitative measurement, which together make possible an experimental verification of scientific hypotheses, has consistently been present. In contrast, many of the phenomena of psychiatry—such as observations of patient's behaviour—are less concrete and not easily quantified; in place of single preponderant cause for disordered function, there are multiple aetiological factors whose respective contributions has to be assessed in terms of statistical probability. About all, there is something disquieting about the concepts of psychological determinism and the predictability of human behaviour. Determinism of human behaviour is much less easy to accept than determinism in the physical sciences. These concepts challenge the religious beliefs of some students and the *amour propre* of most. Perhaps the most striking novelty, however, lies in the apparent lack of objectivity of this subject, an aspect which seems even more disconcerting when students realise that psychiatry is concerned not only with the interpersonal relationships of patients and their relatives, but also with the emotional interactions between the observer himself and the person with whom he is dealing. Students find their own feelings and atti-

tudes exposed to critical examination; unless they realise that this is a necessary part of the process of acquiring psychological insight they are apt to react against it—as earlier generations of doctors have done—as an unwarranted invasion of their privacy.

265. We hope that more adequate instruction in the behavioural sciences will have introduced future students to the phenomena of human behaviour, and to the biological, psychological and social factors which influence it. They should be taught that although the study of behaviour employs methods different from those of the natural sciences, its aim is essentially the same: namely to identify regularities in phenomena observed, to advance explanatory hypotheses and to test these hypotheses by experiment, and by controlled clinical observations.

266. The teaching of child psychiatry, which includes specific reference to mental subnormality, can appropriately be given before that of adult psychiatry, in the context of paediatrics, provided there is a proper working relationship with the physicians (see para. 276). It can make a very important contribution to the students' general medical education, because it gives them an opportunity to see for themselves the processes of personality development and family interactions which have been described in their behavioural science teaching. Because the child's level of accomplishment, and his psychiatric symptoms, are alike so clearly related to his relationship with his parents, this field of study provides a suitable illustration of the concepts of dynamic psychiatry. This confrontation more often brings the student inescapably face to face with his own emotional involvement with patients and with their families than does any other part of the medical course, and this alone makes it a significant part of his training. It also enables the student to see for himself:

- (a) the important role which the doctor can play in detecting and remedying instances of complex family pathology, both medical and psychiatric, and
- (b) the need for teamwork by the doctor in close liaison with social and welfare services.

This learning can profitably be applied in the management of adult medical patients as well as of those with overtly psychiatric disorders.

267. The most important practical skill which the student has to learn during his clinical instruction in psychiatry is the use of the interview as a technique of inquiry. "Taking the history" forms part of every student's introduction to clinical methods: but there is a great deal more to this than simply asking a series of prescribed questions and checking the accuracy of the answers. Students must be aware of the factors which impede or distort communication, factors such as limitations of vocabulary, cultural attitudes and social prejudices and, above all, anxiety: students could learn at an early stage to recognise and overcome their own anxieties, as well as those of their patients, when frightening or embarrassing topics have to be discussed. Because an appreciation of the patient's mental state forms an important element in the assessment of many physically ill patients, as well as of those with predominantly psychiatric disorders, psychiatrists should contribute teaching on interview methods, and examination of the mental state, as part of the students' introduction to clinical work.

268. During their clinical instruction in general medical wards and outpatient clinics students will meet many patients whose symptoms are partly, if not wholly, attributable to emotional disturbances. The students' attention may be drawn to these aspects by the physician but it would be to their advantage to have regular teaching in which a psychiatrist discusses the nature and significance of emotional factors in the timing, intensity and even the nature of symptoms conventionally regarded as purely medical.

269. Systematic teaching in psychiatry should review the phenomena of the neuroses the personality disorders (including sexual deviations, alcoholism and other addictions), psychosomatic illnesses and the organic and functional psychoses and give a critical appraisal of the present state of knowledge about each of these conditions. At the same time the student should have an opportunity of learning the role of other members of the treatment team—the clinical psychologists, psychiatric nurses and social workers—and should be shown how local authority and other social agencies contribute to the treatment of psychiatric patients in the community.

*CARSTAIRS, G.M., et al., op. cit.

—See the Report of the Central Health Services Council for the year ended 1st December, 1966 pp. 5-8 H.M.S.O., 1967.

270. Seminar instruction is of particular importance in psychiatry because through observation and discussion of each others performance students are helped to see how their own anxieties can distort their perception of a patient's disturbed behaviour. The closed-circuit television camera, with videotape playback, has proved invaluable in facilitating this kind of learning. Without attempting to lay down any rigid ruling, we suggest that about 60 hours should be divided between formal lecturers and lecture-demonstrations, the lecture-demonstrations (including film and videotape) occupying more than half of this time. Students should have 15-20 small-group seminar sessions in which to present cases and discuss topics arising in the formal course.

271. The clerkship should consist of full-time participation in the work of a clinical firm, for a period of at least one month but preferably longer, for two reasons. First, students report that initially they have to overcome considerable anxieties themselves, because of their unfamiliarity with emotionally disturbed patients; only after the first three or four weeks do they begin to feel able to contribute effectively to the work of the team. Second, psychiatric illness tend to evolve relatively slowly, even where the prognosis is good: weeks rather than days are required in order to observe significant changes in the patient's condition. Hence a clerkship which involved daily part-time attendance at the psychiatric ward for six to twelve weeks should be even more rewarding than a shorter full-time clerkship.

272. In summary, clinical psychiatry in the undergraduates course should have the following aims:

- (a) to make the student aware of the important influence which a patient's mental and emotional state may have on his physical well-being and his practical abilities; and to indicate the biological, environmental and personal factors which underly mental and emotional disturbances;
- (b) to impart the technique of interviewing a patient, particularly in taking the psychiatric history and assessing the patient's mental state;
- (c) to review the phenomena of psychiatric illness, and the present state of knowledge about their aetiology;
- (d) to give the student some understanding, as a participant-observer, of the organisation and conduct of treatment in the psychiatric service.

OBSTETRICS, GYNAECOLOGY AND PAEDIATRICS

273. The present undergraduate course includes, in obstetrics, a period of residence in hospital during which the student undertakes the conduct of deliveries under supervision. Most students find this a valuable part of their clinical education. They value the sense of responsibility for caring for the mother and her child at a significant moment in their lives. They can acquire new skills, not only in the conduct of the delivery but in local analgesia and suturing. The period of residence in the maternity unit should be retained so that the student can get a proper appraisal of practical obstetrics and can care for his patients throughout labour and not merely at the time of delivery. A thorough grounding in the principles of ante-natal and post-natal care is also essential. This will include study of the effects of pregnancy on disease and of disease on pregnancy. The student should learn something of preparation for child birth and parenthood and of the general principles of human reproduction. The psychological aspects of pregnancy, labour and the puerperium should be studied. The undergraduate students can be expected to learn only the general principles of obstetrics: practical experience of abnormal obstetrics is more properly acquired after registration when the student will have learned to care for patients and deal with emergencies.

274. The post-natal clinic offers a good introduction to the study of gynaecology. Modern gynaecology is concerned with much more than the surgery of the genital tract. It includes the care of women of all ages. Further instruction should be given on the physiology, including the endocrinology, of the reproductive organs. The student must learn how to examine the pelvis and to carry out investigations such as cervical cytology. The operation theatre is a good place to learn methods of examination and to see the commoner diseases, although details of gynaecological surgery are a matter of post-graduate instruction.

275. Students must learn about problems of fertility and infertility as they affect the individual and the community.

There should be a family planning clinic in every teaching unit. Students should also attend the clinics for marital problems which are held jointly by departments of psychiatry and gynaecology in some hospitals and should be extended.

276. A university department of paediatrics, headed by a Professor with responsibility for coordinating the teaching of all departments concerned in this subject, should be established in every medical school. Teaching on the newborn should be given in the maternity unit and should include instruction on foetal development and growth, on the management of the normal and premature infant, infant feeding and the diseases and disorders of the newborn. Later the student should study the child in his home and school environment and be made aware of the services provided by local authorities and others for the care of children. He should be made familiar with the growth and development of the normal child and with immunisation procedures. Diseases and disorders of childhood will be studied in the outpatient clinics and wards of the hospital. An introduction to child psychiatry, including the study of mental subnormality, should also be given at this stage (see para. 266).

GENERAL PRACTICE

277. We think that every undergraduate medical student should be given an insight into general practice. In the past, undergraduate clinical teaching has been based almost entirely on patients referred or admitted to hospital and only recently has an attempt been made to provide some introduction to the wider problems of sickness in the community (see para. 280). The medical student should understand that patients seen in teaching hospitals represent a highly selected group and that an overwhelming majority of those seeking medical attention are treated in general practice without reference to hospital. In addition to the serious conditions which are often first seen by the general practitioner, many common infections are now a days seen only in the home and patients with emotional disturbances and minor psychoneurotic illness usually go no further than the general practitioner's surgery. Certain aspects of medicine, such as domiciliary care of the elderly and the chronic sick, which are becoming increasingly important are best taught in the context of general practice; students should also learn techniques of preventive inoculation. The student must be given an opportunity to see for himself the impact of illness and death on the family, and to learn how the general practitioner meets the clinical, personal and social problems involved. He should see patients presenting new symptoms to the doctor for the first time, and learn how decisions have to be made at this stage. Moreover, he should see how the doctor-patient relationship often differs in general practice from that in the hospital. Students should be able to visit patients in their homes more easily than they do now, although this practice is already more common than many witnesses appear to have realised.

278. The undergraduate medical student should in our view, learn about general practice not as a preliminary to training for a career in that field but as an educational experience whose purpose is to give every student some understanding of problems which are of major importance in themselves and should not be thought of as variants or minor subdivisions of the problems raised in hospital practice. The aim of the teaching should be to afford the student an insight into the nature of the problems and opportunities in general practice. No department in the medical school is ideally fitted to provide the necessary teaching. Departments of social medicine or community medicine (see paras. 280-282) may provide a suitable environment, but there should always be strong links with the department of medicine. Some medical schools have appointed Professors or lecturers in general practice; we think that universities should offer senior academic appointments in this field, and that general practitioners taking part in the teaching of medical students should be properly paid and given university status appropriate to their standing as teachers and contributors to research, the possibility of such university appointments, with the additional financial reward they would carry, should increase the attraction of general practice for good doctors.

279. In some medical schools undergraduate students are attached for a few weeks to selected general practitioners, sitting in at their surgeries and accompanying them on visits; additional time may be spent in this way in an elective period. We think (see chapter 2) that the future will see an extensive development of health centres and group practices in close association with hospitals; when they are situated near a medical school or a university teaching hospital they should certainly

contribute to undergraduate education, especially when they provide an example of teamwork between doctors and the related social services. We do not wish to lay down in detail any particular scheme and would encourage universities to experiment with different approaches. A series of formal lectures on the subject of general practice would seem particularly inappropriate; much more can be accomplished by arranging that the student meets family doctors either on an individual basis or in small informal groups.

COMMUNITY MEDICINE

280. The term as we use it includes much work done in university departments of social and preventive medicine and public health, as well as some activities often found in other departments. In our view undergraduate medical education should include some study of this field. Students should be whole population, and with the related social and economic problems; this involves an appreciation of the epidemiology of disease and of the contributions that are made by the hospital, general practice, local authority and other services. Instruction in general practice (see paras 277-279) provides a suitable opportunity for introducing the students to some aspects of social and preventive medicine, but does not in our view offer a sufficiently broad approach; we think there is more advantage in the establishment of a department or division of community medicine which would concern itself with all aspects of the subject. An important function of the department of community medicine would be to develop close relations between those working in all the branches of the health services; at present the only well-established link represented in the medical school is that between part-time consultant teachers and general practitioners. The department of community medicine should encourage experimentation in the provision and organisation of health services. It should also contain sections dealing with epidemiology, statistics and computers, preventive medicine and rehabilitation.

282. From the educational point of view the department of community medicine should have an influence throughout the undergraduate medical period (see para 258). The department could offer instruction during the pre-clinical stage in the broader aspects of community health and in the means of providing medical care, with reference to problems both in this country and in other parts of the world. In this way the department might well provide a bridge between the social and behavioural sciences, statistics and population genetics on the one hand and the clinical aspects of epidemiology and medical care on the other hand. In terms of the flexible course structure we have suggested in paras. 213-222, the department might well be able to design a programme extending perhaps over two or three terms which would count for credit towards the medical science degree as well as meet some of the requirement of the clinical stage.

EXAMINATIONS

283. A course based on the principles outlined above would have no place for the kind of examination which has traditionally dominated the medical course, particularly in the preclinical stage. Some medical schools, with the encouragement of the General Medical Council, have gone some way towards lessening the impact of the "2nd M.B." by spreading their preclinical examinations over a period of a year or more; the modular course we have proposed above would imply an extension of this practice to the logical conclusion of assessing the student's performance in each subject as it was studied. We hope the assessment would take fully into account of the industry and understanding shown by the student throughout his work in the subject, and not be based solely on a formal test at its completion. The medical science degree "examination" would then consist mainly of a careful review of the student's achievement, as shown by frequent reports or minor examinations, in each module he had taken. These assessments could be supplemented by an addition final test if this were needed to resolve any doubts about the appropriate class of degree.

284. The same principles should apply to the award of the degree in medicine. The student must meet the formal requirements of a licensing body for the purpose of the Medical but when the licensing body is a university we see no reason why its requirements should not be interpreted in terms of an assessment built up from periodic reports on the student's performance, based where appropriate on written oral or practical tests, and completed by a comprehensive review at the end of the course.

285. A reform of examinations in the medical course is required, we think, quite independently of the changes we have proposed in the structure of the course. The present methods of assessment are widely recognised as unreliable and otherwise unsatisfactory. We think an appropriate organisation, closely in touch with the development of medical education as a whole should be charged with the responsibility of studying and improving methods of assessment in medical education, and perhaps of providing a service to universities and postgraduate training bodies (see para 569) on the lines of that offered in the United States of America by the National Board of Medical Examiners.

286. One of the great advantages of the recommended new approach to assessment is that students would be kept constantly aware of their progress and would not feel obliged, as many now do, to check their readiness for the final examination by entering for an external qualifying examination, such as that for the conjoint Diploma of the Royal College of Physicians and Surgeons. One of the chief virtues claimed for these and similar examinations is their independence of the student's university teachers. We think, however, that assessments which are carried out, like these, in isolation from the course of study that has been followed by the candidate, and which are based on his performance on a single occasion rather than on his work over the whole course, are unreliable and anachronistic. Many medical schools in Britain strongly discourage their students from entering for such examinations before the end of the degree course, because the student cannot devote himself as he should to his university work if he is simultaneously preparing for an unrelated examination. We do not think the standard of university medical degree requirements is so high that any medical student need invest time and effort in working for an alternative qualification as a form of insurance against failure to get a degree. In recent years over 500 candidates annually from British medical schools have been awarded such non-university qualifications, but our enquiries have shown that the great majority of medical students at British universities have passed their final degree examination at the first attempt, and that of the 5,312 who obtained a "registrable primary qualification" in the three academic years from 1962 to 1965, only 235 (less than 5%) had to rely solely upon a non-university qualification for admission to the Medical Register. Had the non-university diplomas not been available the number who would have lacked a registrable qualification might have been even lower than the above figures imply, because the candidates would have worked more single-mindedly; some at least might have worked harder. We make no comment on the standard of the non-university diploma examinations: the General Medical Council is the appropriate body to decide whether their standard is high enough to warrant admission to the Medical Register. Some means must be provided whereby doctors educated overseas can obtain a British registrable qualification without repeating the whole or large parts of the undergraduate course. Dentists seeking a medical qualification, with a view to Consultant appointments in oral surgery, have also been accustomed to rely upon diploma examinations in order to avoid repeating a large part of the undergraduate course; we think they should be allowed to continue to do so until suitable arrangements are made in the university course to meet their needs. Subject to this reservation, we think that medical students at British universities should not be allowed to enter for non-university qualifying examinations until they have completed the medical degree course.

*Almost all those students took the Conjoint Diploma of the Royal College of Physicians of London and the Royal College of Surgeons of England (See Appendix 9, Table 5).

@See Appendix 9, Table 6.

†See Appendix 9, Table 4.

ANNEXURE X

A note on health services for the developing countries.

KNOWLEDGE, THE BRIDGE TO ACHIEVEMENT

By Dr. M. C. Candau,

Director General, World Health Organisation.

(In dealing with the problems of developing countries)

We are faced with a maze of immense complexity, involving social, cultural, and economic considerations not normally regarded as being the concern of health authorities.

It is a maze which never before has had to be traversed under exactly the same condition. Certainly, the most highly

developed countries have, to same degree, succeeded in arriving nearer its centre, but they made many mistakes on the way and the health problems which they face today are often as grave as if different in kind from those facing the developing countries. Can we help the latter to refrain from making the same mistakes? Can we identify the clue which might lead us through the maze?

In spite of national efforts and international aid on a scale never known before, the gap between the developing and developed countries is increasing. This is true in all fields, health, agriculture, industry, economics, and social development. It may be that the efforts are inadequate in volume, or that they are being misapplied. In order to analyse this, it is not sufficient to study the different fields separately. They are interdependent, not independent.

In effect, this demands what might be called an ecological approach, in which man is looked upon as a part of an ecosystem, inseparable from his environment, comprising all fields mentioned. Human ecology has been defined as human housekeeping. I believe that, if we keep this simple metaphor in mind, we are likely to arrive much more easily at sensible priorities for the use of our slender resources.

Our real objective is to help developing countries to become self-sufficient. They are sovereign states which must take, or learn to take, their own decisions. They cannot do this without knowledge, and this knowledge is needed, not only at the policy level, but also amongst those who are going to carry out the policy. If it is not available at all levels, confusion and waste of slender resources are inevitable.

There is no question that the intellectual potential of the populations of developing countries is equivalent to that of the developed countries. That it is not being achieved obviously results from the fact that the educational possibilities are much less at all levels primary, secondary, undergraduate, and graduate.

If the intellectual potential of the developing nations is to be realized, as it must be, the essential requirements for a healthy upbringing—food, care, and education—must be provided. Health programmes are vitally important here, but the difficulty in many countries is to persuade the economists that they are essential now, not so much because they will have an immediate influence on the well-being of the country but because without them, in 10 or 20 years' time, the country will have lost some of the cream of its heritage.

Too much will have been skimmed off in the haphazard mortality and morbidity of communicable diseases and malnutrition. It is salutary to point out that in the most highly developed countries the infant mortality rate is approaching 15 per 1000 population, whereas in some countries it is still between 150 and 300 per 1000, a tenfold difference. There is no correlation between brains and infant mortality in such areas. The more healthy infants that survive the more likely developing countries are to find the brains and ideas they will need in the coming generation—if they educate them.

Turning to education in the health professions, which is my main concern, experience has shown that it is a grave error to copy slavishly the traditional types of medical education. These were developed towards the end of the last century during the early years of scientific medicine, long before the sensational advances in modern medicine of the last 30 years or so. Even in the most highly developed countries there is dissatisfaction with current curricula. Many of the leading schools in both Britain and the U.S.A. are radically revising their curricula to deal with new medical knowledge and the changing pattern of disease in those countries. These revisions take into account the quantity and quality of the medical personnel available. They are not, however, designed for the totally different problems in the developed countries, where not only are the diseases different, but also the possibilities and resources for dealing with them.

Solutions to disease problems adopted in the well developed countries are often inapplicable and even undesirable in the developing countries.

Even in the richest countries, it is acknowledged that the distribution and delivery of the quality of medical care of which we are now capable leave much to be desired. The developing countries should not make the mistake of copying

these systems simply because they have been adopted by the wealthier countries.

We need to re-examine the educational system leading to the development of health personnel, at all levels, in the context of the needs of the country concerned. This implies the development of a health policy, followed by the formulation of a health plan, which is the first step in its implementation. Obviously, these depend on the specific situation for which they are intended. There can be no international blueprint for the development of health services. There are many alternatives some of which may be suitable in one situation, whereas in others a different policy may be preferable. An attempt to introduce in a developing country the policy adopted in the developed country is often doomed to failure and may cause stresses, economic and cultural, which may prove intolerable. The success of all plans depends, in the last analysis, on the availability of people competent to carry them out. There is a shortage of trained persons every where and at all levels. But no educational system can be effective unless its purposes are defined. The members of the health team must be trained specifically for the tasks which they are destined to perform, taking into account the circumstances under which they will work. These tasks can only be defined, in accordance with a plan in which the nature of the services to be provided is defined, priorities are allotted, and the staff needed to provide these services determined both in numbers and in terms of the training required for the duties envisaged. The training provided must then be tailored to meet these needs.

I must however emphasize here that the development of a health plan for a country demands projection of trends into the future. The time taken for a plan to have a significant effect is so long—usually at least ten years—that, unless this is done, the plan may be inappropriate by the time it is working effectively. We must not delude ourselves that by concentrating our resources on obvious immediate needs we are necessarily doing the best thing for the country in the long run. Difficult decisions will have to be taken and often emotional pressures will have to be opposed. To do this effectively the application of the techniques of operational research, cost benefit analysis, etc. is needed. Without them policy decisions will be difficult to justify on rational rather than on emotional grounds. Sound policy decisions demand this.

Assuming that a policy and a plan have been formulated, it is necessary, as I have already pointed out, to define the people needed to implement it and to provide for their training.

First, I would like to emphasize that the allocation of responsibility for health activities to various members of the health team needs to be re-examined. In the wealthier countries, there are many activities which are regarded as the sole responsibility of physicians, but which can perfectly well be performed by nurses or other members of the team, if they are suitably trained. In the developing countries, there is no possibility of producing enough physicians to carry all their traditional functions for at least a generation. These duties therefore have to be reallocated. Certainly much can be done in this respect furthermore, the effective usefulness of a physician could be greatly extended by the application of relatively simple and inexpensive means—at least in comparison with the cost of training a doctor—involving the application of modern technology. We must examine new ideas in order to solve problems which otherwise seem insoluble. And we must train and equip the health team appropriately.

Let us examine what kind of a physician we would need: what should be the emphasis in his training and where should he be trained? He has to learn the broad concepts of the genesis of disease, especially those prevalent in his country, so that, as leader of the health team, he can guide his colleagues towards the implementation of preventive measures. He has to develop a diagnostic sense which is not dependent on elaborate laboratory tests, because all too often laboratories will not be available to him. He will have to learn to use—let us admit it—therapeutic tests to confirm his diagnosis. In pre-war days and during the war, many of us had to use such techniques and the results were quite good; certainly much better than those obtained now in areas without, or with only minimal, health services. Perhaps 90% of illnesses can be dealt with in this way. The other 10% cannot at present be dealt with in any way. That will come, but it is many years ahead.

But I ask again, how and where can we train physicians for such tasks? Firstly, I would state that it should not be in the highly developed countries. There physicians are trained

to rely extensively on laboratory tests and sophisticated techniques which will not be available in the home country. Secondly, they will not be taught the problems associated with the diseases prevalent in their own country, because usually these diseases do not exist in the highly developed country in which they are being trained. Thirdly, in most medical schools in highly developed countries the teaching of preventive medicine is either lacking altogether or is rudimentary. Few of them go beyond instruction in prophylaxis by immunization and hardly include the elementary facts of environmental health and personal hygiene which can have such immense influence on many diseases in developing countries.

The physician must be trained in an environment as similar as possible to that in which he is eventually going to work. This may not be possible because of the grave shortage of medical schools in developing countries. Schools in highly developed countries interested in providing such training should be supported. In international aid—especially bilateral aid, because international funds are so limited—this should receive a high priority.

I have outlined in very general terms the context in which medical training must be developed. It is a matter of urgency because so many people have literally nothing in the way of medical care. We have to develop simple measures first because persons so trained can deal with many of the major problems at relatively low cost and with extensive use of paramedical personnel. Later on, facilities for such things as open heart surgery or tissue transplants can be provided, but we need basis health services immediately and we must orientate medical education accordingly.

WHO emphasizes preventive medicine because it is the most economical solution to certain health problems. At the same time, it recognizes that there are many health problems, of which some are not preventable. In other words, in the health plan, curative medicine must be provided alongside preventive measures. A balance must be arrived at, and that is not easy, because the demands of curative medicine always seem to be more urgent than those of prevention. Much wisdom and sound judgement are needed here.

The medical curriculum must be developed in this context and in the context of the health plan.

To summarize, copying the medical schools in developed countries is a mistake. New curricula and new methods of training are needed in the developing countries, designed for their special needs. Let us recognize that even in the most highly developed countries the recent sensational scientific advances in medicine are available to very few and, more important, that the majority of medical problems can be dealt with relatively cheaply without these techniques.

We must define what the doctors are going to do, what the nurses and the other members of the health team are going to do and they should be trained to take on, under appropriate supervision, much more responsibility than is usual in the highly developed countries. Even the later, suffering as they are from a serious shortage of medical manpower, must re-examine their allocation of responsibilities between doctors and nurses and other personnel. There is too much of the old trade-union system in the medical profession, especially in the highly developed countries. We must prevent this from being continued in the developing countries or they will be headed for disaster. I fear that this attitude is already established in many.

When one thinks of the enormous efforts that the newly independent countries have made to liberate themselves, it is, perhaps surprising that they have not realized that they need to free themselves from what might be called a technical colonialism as well. Technology may be international in substance, but its method of application must be adapted to the situation in which it is to be applied. The universities in the developing countries, the subjects taught, and the methods of teaching are still modelled on the 'old country'. This should not be so. They should be devising new methods, new subjects, and new ideas relevant to their new problems. If they do this, they will perhaps design the university of the future, which may eventually be copied in the "old country".

Innovation is what we need in all countries. Innovation depends on knowledge. Knowledge is the bridge to achievement but education is the bridge to knowledge.

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ANNEXURE XI

Indicative Curricula and details of syllabi.

1. Anatomy including embryology, histology and elements of genetics	91—96
2. Physiology and Biochemistry	97—104
3. Family Planning	104—106
4. Pharmacology	106—108
5. Pathology (General, special and clinical)	111—115
6. Microbiology, parasitology Immunology and, virology	116—118
7. Preventive and Social Medicine	119—126
8. Medicine	126—138
9. Paediatrics	128—129
10. Surgery	129—131
11. Obstetrics and Gynaecology	131—132
12. Orthopaedics	131—
13. Ophthalmology	132—133
14. Otorhinolaryngology	133—
15. Anaesthesiology	133—134
16. Dermatology and Venereal Diseases	134—
17. Mental Diseases	134—135
18. Tuberculosis	135
19. Radiology	135
20. Dentistry	135

ANATOMY

Recommendation for the course in Anatomy, Histology, Embryology and Principles of Genetics.

Distribution of teaching hours.

Lectures	150 Hours
Demonstrations	200 "
Dissection	200 "
Practical histology	80 "
Practical embryology	10 "
Radiology	5 "
Tutorials	100 "
Seminars	15 "
Examinations	50 "
TOTAL	810 hours

1. Dissection of the entire human body is not considered essential. The student may dissect either the abdomen or head and neck. Dissected parts should be demonstrated to small groups of students and such parts should be made available to students for purposes of study on their own.

2. Dissection of the brain is not essential. Dissected parts should be demonstrated to small groups of students, and dissected specimens of the brain made available to students for purposes of study on their own.

3. There must be close correlation in the teaching of gross anatomy, histology, embryology and Genetics. The teaching of areas and systems in anatomy, physiology and bio-chemistry should be integrated as far as possible, and the curriculum suggested has to be kept in view.

4. Joint seminars with the departments of physiology and biochemistry should be organized once in three months.

1st Semester

1. General anatomy and general histology.

2. Dissection and demonstration of upper and lower extremities and thorax.

2nd Semester

3. General Embryology, principles of genetics, organology, development of thoracic and abdominal organs, principles of family planning.

4. Dissection and demonstration of abdomen.

3rd Semester

5. Organology and development of the nervous system, special sense organs, and the head and neck.

6. Discussions and demonstration of head and neck and brain.

Introduction, elementary genetics, general embryology and general histology.

Introduction

1. Medical Education: Aim and scope, planning of medical education with reference to problems special to India (explosive population, preventive medicine, problem of rural medical care).

2. Anatomy—Position of man in the animal world, study of man—methods, ecology of man i.e. man in relation to the environment, conception of health and disease.

3. Units :—Unit of life, protoplasm, unit of Biology, cell, physical properties, chemical composition and function of protoplasm.

4. Modern Conception of the Cell :—Components and their function, transfer through cell membrane, methods of study of cell, types of cell—morphological and functional—why a cell divides.

5. Outline of a development anatomy :—Prenatal development (embryology), post-natal developmental, (basic process in embryology—cell division growth and different action, stages in embryology);—utility of knowledge.

6. Cell division :—Types, significance of meiosis, Chromosomes.

7. Spermatogenesis and Oogenesis; formation of gamete. Fertilisation.

1.1. *Elementary Genetics* :—Definition; health and diseases, result of interaction between organism and its environment individuality, of man, utility of knowledge.

2. Mendel's Laws. Their significance, pedigree study (historical background) discovery of Chromosome, mutation (Morgan and Muller).

3. Cytogenetics : Study of chromosome technique, classification, terminologies.

4. Identification of sex :—Nuclear sexing, chromosomal sex, anatomic sex, sex-chromosome, sex gene and sex-linked gene.

5. Types of inheritance; Autosomal dominant, autosomal recessive and sex-linked inheritance (Haemophilia).

6. Inheritance acquired character, congenital, hereditary and familial diseases.

7. Abnormality of Chromosome—Aneuploidy and polyploidy; non-disjunction—monosomy and trisomy (Klinefelter's, Turner's and Down's syndromes).

8. Applied genetics—and genetic counselling (problem of cousin marriage).

9. Mutation, cause—effect of radiation.

Embryology.

1. Sex glands—male and female.

2. Physiology of pregnancy.

3. Fertilisation and its result : morula, blastula, implantation—normal and abnormal.

4. Decidual formation, placenta—its development and function, placental membrane—transfer across the membrane.

5. Inner cell mass—formation of foetal, membranes and germ layers.

6. Twins—uniovular and biovular (twin studies with respect of significance of environmental factor in growth and development).

7. Derivatives of germ layers.

8. Folding of the embryo.

9. Physiology of pregnancy; growth and development, diet, antenatal care; socio-economic impact on development and disease.

General Histology (to be taught with general anatomy)

1. Histology—histogenesis and organogenesis, components of tissue—cell and matrix and tissue fluid; part played by organ system to maintain homeostasis, Matrix-components.

2. Classification of fundamental tissue; (a) feature (b) dev. source, (c) function, (d) classification, (e) power of regeneration.

3. Epithelial tissue—Classification—and function, Glandular division of epithelium : Dev. of exocrine and endocrine glands.

4. Connective tissue; features, classification, modification according to function

5. Areolar tissue; functional component, role in inflammation and metaplasia.

6. Specialised connective tissue; adipose tissue, haemopoietic tissue, reticulo endothelial system.

7. Fibrous tissue—Fascia, capsule, ligament, tendon, and aponeurosis.

8. Cartilage; types, function, articular and epiphyseal cartilage.

9. Physiology of calcification—calcified cartilage and bone,

10. Bone; property, composition. Classification, long bone parts of periosteum its function, blood supply and growth classification, its application in healing of fractures.

11. Influence of nutritional (mineral) and hormonal factors and endocrine factors in bone growth.

12. Joints—development and classification and nature and function; joint diseases and invalidism.

13. Muscle, classification, function, Lever mechanism skeletal muscle, motor unit, hypertrophy and atrophy.

14. Nerve tissue, components—neuron and neuroglia; formation of a spinal nerve.

15. Cardiovascular; system; Basic principles of working of structure function correlation.

16. Venous and lymphatic system, Defence mechanism of body.

Organology : To be taught with regional anatomy) structure (microscopic).

1. The oesophagus stomach, duodenum, jejunum, ileum, vermiform, appendix, caecum large intestine, liver, gall bladder, pancreas, spleen, kidneys, ureters, urinary bladder.

2. Trachea, tongue, soft palate, lungs.

3. Heart, aorta, arteries, veins.

4. Brain—motor cortex, sensory cortex, occipital cortex, cerebellum transverse section of mid-brain, pons, medulla oblongata.

5. Spinal cord—transverse section at various levels, spinal nerve, spinal, ganglion.

6. Muscle—plain, striated, cardiac.

7. Lymphoid tissues, lymph node, tonsil.

8. Reproductive organs—ovary, fallopian tube, uterus, cervix, vagina, Testes, vas deferens; seminal vesicles, prostate.

9. endocrine glands—thyroid thymus, pituitary, supra-renal, pancreas, ovary, para-thyroid.

10. Special sense organs—skin, eye, ear nose and taste buds.

SYLLABUS*General Anatomy (8 lectures)*

1. Anatomical position, descriptive anatomical terms (medial, lateral, neutral dorsal, caudal, frontal sagittal etc.)

2. phases of growth and development, anatomical changes during.

3. The skeletal system—variations with age, sex, race-types of bones, their development. The upright posture, maintenance of; joints—types of structure of ligaments; movements; bone marrow, functions of.

4. The muscular system, types of muscle, functional muscle groups, neurovascular bundles, functional nerve muscle relationship, action of muscles in relation to movement of joints.

5. Connective tissues—skin superficial fascia, deep fascia, ligaments, cartilage, blood.

6. The nervous systems—brain, spinal cord, spinal nerves, nerve plexuses; dermatomes innervation of muscles, sympathetic and parasympathetic nervous system, innervation of, blood vessels and organs.

7. The cardiovascular and lymphatic systems—heart, systemic vascular circulation, the pulmonary circulation, portal venous system; lymphatics lymph nodes, principles of application of a tourniquet.

REGIONAL ANATOMY

Upper Extremity—(8 lectures)

1. Skeleton of, position of joints, functions of.
2. Muscle groups, brachial plexus, innervation of muscles and skin and joints.
3. Arterial supply, venous drainage. Neuro vascular bundles, lymphatics and lymph nodes, relation of nerves to bones.
4. Joints with special emphasis on shoulder elbow and wrist joints, muscles producing movement, results of nerve injury.
5. Radiology of bones and joints, ossification, determination of age.
6. Applied anatomy—nerve injuries, results of principles of treatment of; Erb's palsy medial, ulnar and radial nerve injuries, intravenous and intramuscular injections, dislocation of the shoulder joint.
7. Surface marking of main arteries and nerves.

Lower Extremity—10 lectures.

1. Skeleton of position of joints, function of.
2. Muscle groups, lumbar plexus, innervation of muscles, skin and joints.
3. Arterial supply, venous drainage, neuro-vascular bundles, lymphatics and lymph nodes, relation of nerves to bones.
4. Joints with special emphasis on hip joint, knee joint ankle joint.
5. Radiology of bones and joint ossification determination of age.
6. Applied anatomy—injuries to sciatic superficial and deep peroneal nerves, results of; intramuscular and intravenous infections, varicose veins, flat foot.
7. Surface marking of main arteries, nerves and saphenous vein.

Thorax—8 lectures.

1. Skeleton, of, joints of. Muscles of chest wall, diaphragm, innervation of, abdominal and thoracic respiration, differences with age. The mammary gland. Lymphatic drainage.
2. The pleura and lungs.
3. Arrangement of structures in the mediastinum, the heart, coronary arteries, great vessels, trachea, oesophagus, lymph nodes, thymus.
4. Radiology of heart, aorta, lungs, bronchogram.
5. Applied anatomy—Sternal puncture—pericardial paracentesis, pleural paracentesis, common acquired and congenital valvular defects of the heart, and of the great blood vessels.
6. Surface—marking—pleura, lungs, heart, valves of.

Abdomen and pelvis—20 lectures.

1. The abdominal wall—skin and muscles, innervation of fascia, peritoneum, blood vessels, lymphatics, autonomic, ganglia and plexuses.
2. Stomach, small intestine, caecum appendix, large intestine.
3. Duodenum, pancreas, kidneys, ureters supra renals.
4. Liver and gall bladder.
5. Pelvis, skeleton and joints, muscles, the pelvic organs and external genitalia in the male and in the female, lumbosacral plexus, vessels, lymphatics, autonomic ganglia and plexuses.
6. Blood vessels and nerve plexuses of abdomen and pelvis, the portal venous system.
7. Applied anatomy of referred pain, abdominal paracentesis, abdominal incisions, portal systemic anastomoses, physiological changes in pregnancy, tapping of a liver abscess, local anaesthesia, rectal and pelvic examination. Catheterisation of the urinary bladder in the male and female; principles of family planning.

8. Radiology, barium meal, barium enema, pyelogram, cholecystogram, uterosalpingogram;

9. Surface marking of organs and blood vessels.

Head and Neck—(25 lectures).

1. The entire vertebral column—movements of.
2. Scalp—innervation, vascular supply, middle meningeal artery.
3. Face—Main muscle groups—muscles of facial expression muscles of mastication, innervation of skin and muscles, vascular supply, principles of repair of scalp and face wrinkles.
4. Parotid gland—position, relation to facial nerve.
5. The eyelids, eyeball, lacrimal apparatus, the muscles that move the eye-ball, innervation of ophthalmoscopic appearances.
6. The nasal cavity and nasopharynx.
- Septum, conchae, paranasal sinuses, eustachian tube, lymphoid masses.
7. Oral cavity and pharynx. Tongue, innervation of vascular supply, lymphatic drainage, soft palate, tonsil.
8. Larynx and laryngeal part of pharynx, structure (no details), functions, nerve-supply, laryngoscopic appearances.
9. Cervical vertebrae joints of head and neck.
10. Structures of neck.

Sternomastoid, brachial plexus, main arteries and veins, disposition of lymph nodes, areas of drainage phrenic nerve, thyroid gland, its blood supply, parathyroid, the trachea, oesophagus. The position of the sub-mandibular and sublingual salivary glands.

11. Teeth and dentition.

12. The external, middle and internal ear.

13. Applied anatomy of scalp and facial wounds, facial and ocular palsies, tracheostomy. Squint and errors of refraction, larynx, tongue, external, middle and internal ear, other cranial nerve palsies.

Radiology skull, sutures, air sinuses, teeth, ventriculogram, myelogram, barium swallow.

Surface marking. Parotid gland, middle meningeal artery, thyroid gland, common internal and external carotid arteries.

Neuro-anatomy—10 lectures.

1. Meninges—function of.
2. Cerebrum—areas of localisation, vascular supply, basal ganglia, internal capsule.
3. Cerebellum—functions.
4. Pons, medulla midbrain—cranial nerve palsies.
5. Cerebro spinal fluid—formation, circulation, functions, absorption.
6. Cranial nerves, origin, course (with minimum anatomical detail and) areas of distribution.
7. Spinal cord—coverings, segments, relation of segments to vertebral column, spinal nerves, distribution.
8. The sympathetic and parasympathetic nervous systems, location, distribution, functions.
9. Applied anatomy of lumbar puncture, referred pain, caudal anaesthesia, increased intracranial pressure.

TEXT BOOKS (ANATOMY)

Recommended

1. Grays Anatomy—Descriptive and Applied.
2. Cunningham's Text Book of Anatomy.
3. Developmental Anatomy—Arey.
4. Text-book of Histology—Hewer.
5. Cunningham's Manuals of Dissection, Vols. 1, 2 and 3.

Reference

1. Anatomy—Regional and Applied—R. J. Last.
2. Method of Anatomy—Arcuy.
3. Tissues of the body—Le Gress Clark.

4. Human Embryology—Hamilton, Messman and Boyd.
5. Histology—Ham and Leeson.
6. Atlas of Human histology—Di Fiore.
7. Atlas of Anatomy—Grant.
8. Surface and Radiological Anatomy—Hamilton and Simon.
9. Functional nerve anatomy—A. R. Buchanan.

RECOMMENDATIONS FOR THE COURSES IN PHYSIOLOGY AND BIOCHEMISTRY

This syllabus incorporates the newer direction and advances in the subjects and recommends the use of the newer technological advances in instrumentation in the practical courses. Teaching should have an applied and clinical bias, with emphasis on mammalian and human experiments. The historical aspects of the subjects should be touched upon wherever relevant.

<i>Distribution of teaching hours</i>	<i>Physiology</i>	<i>Bio-chemistry</i>
Lectures	185	98
Practical & Demonstrations	225	155
Tutorials	75	55
Seminar	15	12
TOTAL	500	320

At least 10% of the time allotted for teaching should be utilised for the various examinations, and may be distributed as follows:—

Distribution of hours for examination.

	<i>Physiology</i>	<i>Bio-chemistry</i>
Day to day Examinations	30	18
Semester Examinations	20	12
TOTAL	50	30

I Semester :

- | <i>Physiology</i> | <i>Biochemistry</i> |
|--|--|
| 1. General physiology and principles of Biophysics | 1. General Principles & elements of Biophysics. |
| 2. Nerve and muscle | 2. Chemistry of carbohydrates, lipids, proteins, aminoacids and nucleic acids blood and enzymes. |
| 3. Blood | 3. Chemistry of respiration and acid-base balance. |
| 4. Respiration, including fluid and pace physiology. | 4. Gastrointestinal system. |
| 5. Gastrointestinal system. | |

II Semester :

- | | |
|--|---|
| 1. Gastrointestinal system contd. | 1. Energy metabolism. |
| 2. Cardio-vascular system. | 2. Metabolism of carbohydrate, lipids and proteins. |
| 3. Kidney | 3. Nutrition and vitamins. |
| 4. Special senses, skin and temperature, regulation. | 4. Excretory system. |

III Semester :

- | | |
|--|--|
| 1. Nervous system. | 1. Hormones. |
| 2. Endocrines including physiology of reproduction | 2. Neurochemistry, including special metabolism of nervous system. |
| 3. Physiological psychology. | 3. Nutrition and vitamins. |

Joint courses :

Some of the systems should be taught not only after due consultations with the different departments, but should actually form joint courses between two or more departments. For example Biophysics must be a joint course taught by the departments of Physiology and Biochemistry. Department of Biochemistry should be responsible for teaching physical chemistry and allied phenomena involved in biophysics and methodology like chromatography and colorimetry, while physiology should teach bio-electricity and principles of medical electronics as applied to biophysics. Similarly gastro-intestinal system and endocrinology must be joint courses

taught by the departments of Biochemistry and physiology and intimate consultation should be done with the department of Anatomy for the structural correlates. Teaching of nervous system must be a joint course taught by the departments of Anatomy and physiology.

Seminars :

Periodically (one in three months) a staff seminar should be arranged by the members of three departments of Anatomy, Biochemistry and Physiology to bring home the point to the students that it is an integrated approach which is most meaningful. For example in the 1st Semester, a symposium may be held on the biology of cell. The structure of the cell may be dealt by the anatomist, the organelles and the sub-cellular particles and their role in metabolic processes and the methods to assess them may be done by the biochemist, and towards the end, the physiologist may attempt to integrate how the cell behaves as a unit of behaviour coordinating the characteristic biochemical and the structural components sub-serving specific functions. Once a month, a student seminar should be held lasting for about 2 hours in which 4-6 speakers should be allotted topics on the portion of the systems already covered in Anatomy, Physiology and Biochemistry and these students should be guided by the staff members in preparing their respective topics. Each presentation should be followed by a short discussion in which the other students of the class must actively participate.

Tutorials :

Tutorials should be held every week in smaller groups of not more than 8-10 students. The students should be given ample opportunity to discuss their difficulties on the portion covered in the particular subject during the specific week. Part of the tutorial time may be utilised to assess what a student has learnt during the particular week.

Clinical demonstrations :

The student should be taken to the hospital once in a fortnight during the II and the III Semesters and the cases should be so arranged that these particular aspects of clinical signs and symptoms are demonstrated to the students which they have already covered in Anatomy, Physiology, and Biochemistry. Clinical physiology should be emphasized and must form a part of the University practical examination.

SYLLABUS PHYSIOLOGY

Topics :

General physiology (4 hours).

General principles in the study of physiology; functional organisation of human body, cell as a living unit.

Elements of Biophysics (8 hours)

(Joint course with Biochemistry)

Quantitation; Measurements and instrumentation:—static and dynamic characteristics of instrumentation; feedback system and elementary electronics; equilibrium and the energy functions; electric field—current and electromagnetic energy; electrical and biological potential difference.

Nerve and Muscle (15 hours)

Movements and their evolution; biochemical, thermal and electrical changes and bioenergetic of muscular contraction; membrane and action potential, neuromuscular transmission, fatigue and rigor mortis; degeneration and regeneration in peripheral nerves and neuromuscular disorders physiology of smooth muscle.

Blood (17 hours)

General properties and chemical composition of blood; red blood cells; jaundice and anaemias; white blood cells; platelets and spleen; blood volume, intra and extracellular fluids; blood coagulation and haemorrhagic diseases; blood groups and transfusion.

Cardio-vascular system (26 hours)

Physiologic anatomy and evolution of cardiovascular system; cardiac cycle; electrocardiogram and cardiac arrhythmias; nervous and chemical regulation of heart; cardiac output and

cardiac failure; blood pressure, hypertension and hypotension, arteries, veins and capillaries; physiology of shock; regional circulations; coronary, cerebral, portal and renal.

Gastrointestinal system (12 hours)

(Joint course with Biochemistry)

Evolution of gastrointestinal physiology; mechanism and regulation of salivary, gastric, pancreatic and intestinal secretions; functions of gastrointestinal hormones and secretions, mastication, deglutition, vomiting, gastrointestinal motility; defaecation.

Respiratory system (18 hours)

Functional anatomy and evolution of respiratory apparatus, respiratory movements; mechanics of respiration; lung volumes; intra-pleural pressure, pneumothorax and artificial respiration, pulmonary ventilation and respiratory dead space; nervous and chemical regulation of respiration; the carriage of O₂ and CO₂; abnormal types of breathing, dyspnoea, cynosis; pulmonary function tests.

Elementary aviation and altitude physiology; elements of space physiology.

Excretory system (6 hours)

(Joint course with Biochemistry)

Evolution and functional anatomy of kidney; urine, composition and formation; renal functions and renal function tests; micturition and regulation of PH of blood.

Skin and Body Temperature (5 hours)

Physiology of Skin; regulation of body temperature.

Special senses (20 hours)

Sensations and receptors;

Eye: Structure of eye ball, movements of eye, aqueous and vitreous humor; lens, ciliary muscles, accommodation, optics, refraction and errors, retina, theories of vision and colour vision, binocular and stereoscopic vision, visual pathways and field of vision.

Eur: External ear, middle ear, internal ear, theories of hearing.

Physiology of smell and taste.

Nervous system (35 hours)

(Joint course with Anatomy)

Evolution and history of nervous system; spinal cord and reflex arc and its properties; C.S.F.; synaptic transmission; central excitatory and inhibitory states; somatic sensory receptors and pathways; thalamus; cerebral cortex; motor and associated areas; speech, pyramidal and extra pyramidal pathways; basal ganglia; posture and locomotion; sensory and motor deficits; motor points in man; reticular form formation; EEG; sleep; autonomic nervous system; hypothalamus and limbic system; conditional reflexes, cerebellum.

Reproduction (8 hours)

(Course to be given in collaboration with Departments of Biochemistry, Anatomy, Pharmacology and Preventive and Social Medicine.)

Sexual characters; ovarian and testicular hormones and physiology of reproduction; physiology of menstruation, pregnancy, parturition and lactation; nutritional needs of mother and child during pregnancy and lactation; principles of contraception.

Endocrines (10 hours)

(Jointly with Biochemistry)

Neuro-humoral relationship functions of pituitary, thyroid, parathyroid, adrenals thymus; pancreas (endocrine); physiology of stress.

Physiological Psychology (6 hours)

(This course may be given in collaboration with Departments of Preventive and Social Medicine and Psychiatry).

Elementary psychology, motivation, emotion, drives, instincts, memory, intelligence and elements of their testing.

PRACTICALS

General and Biophysics (8 hours)

Use of recording and display systems (like oscilloscopes, amplifiers, transmitters etc.) measurement of current (A.C., D.C.) and voltage using measuring instruments like electric meters and valve volt meters; use of resistors, condensers and transformers; power supplies; action potentials.

Nerve Muscle (25 hours)

Simple muscle twitch; effect of various stimuli, temperature, food, fatigue; genesis of tetanus; velocity of nerve impulse; isometric contractions.

Blood (35 hours)

General examination (Plasma, serum, clot, fibrin and cells); fragility of R.B.C.; R.B.C. and W.B.C. count; Hb estimation; platelet, reticulocyte and eosinophil counts; making and staining blood slides and differential W.B.C. count; blood volume (demonstration); blood values (M.C.V., M.C.H., M.C.H.C. etc.); blood group; coagulation and bleeding time.

Cardiovascular system (35 hours)

Mammalian heart; perfusion of blood vessels; properties of heart muscle; innervation of frog's heart; effect of vagal stimulation and action of drugs (acetylcholine, atropine, adrenaline, nicotine and ions); clinical examination of C.V. system in man; capillary circulation in frogs; pulse and its recording; polygraph; venous pressure in dog (demonstration); mammalian cardiovascular responses—effects of nerve stimulation, drugs anoxia, hyperapnoea, haemorrhage, etc. (to be done with respiratory responses); clinical case demonstrations, cardiograph.

Respiratory system (14 hours)

Clinical examination of respiratory system, respiratory movements (human and animals); static and dynamic lung volumes; pneumothorax and lung compliance tests (demonstration); Pulmonary function tests, mammalian respiratory responses—effects of stimulation, etc. clinical case demonstration.)

G.I. System (8 hours)

Gut movements; gastric secretins (pouch demonstration); salivary secretion (demonstration), intestinal secretion (demonstration).

B.M.R. (5 hours)

Human—and in rats (demonstration).

Renal Function tests (demonstration) (4 hours)

Eye (10 hours)

Light reflexes, accommodation, sensons images; ophthalmoscopy and retinoscopy; testing of visual acuity, binocular vision and colour vision; perimetry.

Ear (4 hours)

Webbers and Rinnes test; drum examination.

Taste and smell (4 hours)

Olfaction and gustation tests.

Nervous system (35 hours)

Reflexes in frog and demonstration of principle of reciprocal innervation; clinical examination of nervous system in man; sensory, motor, reflexes and cranial nerves; reaction time and reflex action (human); neurological case demonstration and discussion demonstrations; animal and human electroencephalogram (demonstration); chronic animal preparations; cerebral and cerebellar ataxia; motor and sensory deficits (demonstration) cerebellar functions (pigeons—demonstration), experimental obesity (demonstration); self-stimulation (demonstration).

Endocrines (10 hours)

Stress reactions (demonstration) adrenalectomy, thyroidec-tomy, alloxan diabetes (animals; demonstration); clinical case demonstration and discussion demonstrations.

Reproduction (8 hours)

Rat vaginal cytology and effects of stress; ovarian hormones and ovariectomy (demonstrations); clinical case demonstrations; and discussion demonstrations; central nervous lesions, stimulation and reproductive behaviour changes; chronic animal demonstrations.

Revision practicals (25 hours)**BOOKS****Required**

1. Samson Wright's Applied Physiology—Keel and Neil.
or
2. Principles of Human Physiology—Lovett Evans.
or
3. Text book of Physiology and Biochemistry—Bell, Davidson and Scarborough.
or
4. Review of Medical Physiology—W.F. Gannon.
5. Experimental Physiology—Harris.

Recommended :

1. Physiology and Biophysics—Ruch and Patton.
2. Physiological Basis of Medical Practice—Bast and Taylor
3. Humor Physiology—Houssay.
4. Medical Physiology—P. Bard—V. Mountcastle.
5. Text book of Medical Physiology—Guyton.
6. Physiology in Health and Diseases—Viggers.
7. Textbooks of General Physiology—Davson.

Reference :

1. The Kidney : Structure and Function in Health and Disease—Homorarith.
2. The Lung; Clinical Physiology & Pulmonary Function Tests—Comroe.
3. Physiology of the Digestive Tract—Davenport.
4. Cardiovascular Dynamics—Rushmer.
5. Physiology of the Eye—Davson.
6. Fundamentals of Neurology—Gardner.
7. Comparative Physiology—Prosser and Brown.
8. Metabolic and Endocrine Physiology—Tapperman.

BIOCHEMISTRY**Biochemistry including physical Aspects :****Topics :****Introduction to Biochemistry (2 hours)****Physical aspects of Biochemistry (8 hours)**

Colloids and gels; osmotic pressure and membrane phenomenon; surface tension; absorption—chromatography and electrophoresis; viscosity; acids, bases, PH, buffers and indicators; isotopes, measurement, uses and radiation hazards.

Organic aspects of Biochemistry (5 hours)

Problems : Classification, physical properties like osmotic pressure, surface tension, isoelectric point and amphoteric nature, colloidal properties, sedimentation, coagulation denaturation, precipitation and electrophoretic behaviour, molecular structure chemical properties like structure of aminoacids peptide bond, and general reactions of aminoacids.

Nucleic acids and nucleoproteins (2 hours)

Structure, chemistry of purines and pyrimidines nucleotides; importance and relation to viruses.

Carbohydrates (4 hours)

Classification, optical activity, mutarotation and general chemical reactions, structure of glycogen, dextran cellulose, mucopolysaccharides, glycosidic linkage and antigenic activity.

Lipids (3 hours)

General classification, fatty acids (saturated and unsaturated) rancidity of fats, anti-oxidants, phospholipids glycolipids, cholesterol and steroid hormones and lipoproteins

Blood (4 hours)

Chemical composition of blood, haemoglobin and its derivatives, porphyrins; haemolysis and formation and fate of bile pigments; van den Bergh reaction; Plasma proteins and their fractionation.

Enzymes (4 hours)

Chemical nature classification, isolation and characterisation, factors influencing enzyme action, activators and inhibitors, co-enzymes and co-factors.

Digestion and absorption (12 hours)

Digestive enzymes, gastric analysis, formation of HCL; composition of gastric, salivary, pancreatic and intestinal tract; absorption of proteins, fats, carbohydrates, salts and water.

*Secretions and bile; hormones of the gastro intestinal tract.
Respiration and acid base balance (4 hours)

Carriage of O₂ and CO₂, maintenance of acid base balance including role of kidney; acidosis and alkalosis including abnormalities.

General metabolism**Intermediary metabolism—method (2 hours)**

Redox potential and biological oxidation respiratory chain, oxidative phosphorylation (5 hours).

Energy metabolism : Respiratory quotient B. M. R., factors influencing B. M. R., S. D.

Protein metabolism (4 hours)

Dynamic state of body proteins nitrogen balance, aminoacids; formation of tissue proteins, general reactions of aminoacids, formation of Urea, creatine and creatinine; metabolism of aromatic and sulphuro amino acids.

Metabolism of Nucleic acid RNA and DNA and formation of uric acid (2 hours).

Carbohydrate metabolism (4 hours)

Glycolysis and glycogenesis, T. C. A. cycle, regulation of blood glucose concentration, G. T. T. and glycosuria.

Lipid metabolism (4 hours)

Essential fatty acids, synthesis and degradation of fatty acids, ketosis, deposition and storage of lipids, lipotropic factors, cholesterol metabolism, interrelationship between protein, fat and carbohydrate metabolism; mineral metabolism—metabolism of Fe, Ca, Mg., I, Zn, PO₄.

Food and nutrition (5 hours)

Composition of important foods like eggs, fruits, meat, grains and vegetables, under nutrition, malnutrition, processing of food and their effects on health; nutrition of infant, growing child, adult, pregnant and lactating women.

Vitamins (6 hours)

Water soluble and fat soluble vitamins methods of study of vitamins, relation to nutrition and enzyme activity; antimetabolites—introductory.

Hormones (8 hours)

Biochemistry of hormones including general metabolic effects of pituitary, cortical steroids, medullary, sex hormones, thyroid and parathyroid of hormones.

Neurochemistry (5 hours)

General composition and metabolism and biochemistry of synaptic transmission.

Special topics (5 hours)

Biochemistry of formation, formation and composition of urine and kidney function tests and liver function tests; detoxification.

PRACTICALS**Use of indicators (10 hours)**

Titration of weak acids and bases, and determination of PH, osmosis and collids—haemolysis, preparation and properties of colloids. Donnan membrane equilibrium hours).
Proteins (10 hours)

General tests for proteins, specific tests for aromatic, sulphur aminoacids, ninhydrin test, isoelectric point, and formol titration.

Lipids (3 hours)

Tests for lipids and cholesterol; carbohydrates—General reactions, tests for mono, di, and polysaccharides pentoses, ketohexoses, preparation of osazones (7½ hours).

Blood (25 hours)

Haemoglobin derivatives and their spectroscopic examination; analysis of blood for N, P, N, chloride, glucose, serum proteins A/G ratio, calcium and phosphorus.

Urine (20 hours).

Microscopic and physical examination, analysis for inorganic constituents and organic-normal and abnormal constituents (like blood, protein, carbohydrates, ketone bodies, bile salts and bile pigments), estimation of calcium, chloride and glucose (Benedict's and Fehling's methods).

Gastric Analysis (8 hours).

Estimation of free and total acidity, and chlorides.

Enzymes (12 hours)

Trypsin; dehydrogenase; phosphatases; ptyalin.

Analysis of milk and eggs. (12 hours).**Demonstrations (20 hours)**

Microkjeldahl estimation of nitrogen; PH meter; colorimeter; spectrophotometer; flame photometry; chromatography; electrophotometer; flame electrophoresis; graphy.

The remaining 35 hours may be devoted for revisions.

TEXT-BOOKS**Recommended**

1. Biochemistry—Kleiner and Orten.

or

2. Biochemistry—Cantarow and Schepartz.

3. Coles, Practical Physiological Chemistry revised—Baldwin and Bell.

Reference

1. Text-book of Biochemistry—West and Todd.

2. Review of Physiological Chemistry—Harper.

3. Practical Physiological Chemistry—Hawk, Oer and Summerson.

FAMILY PLANNING**Anatomy****Curriculum and outline of syllabus**

1.1. Gross and microscopic anatomy of the male and female generative organs.

1.2. The Menstrual cycle.

1.3. Spermatogenesis and Oogenesis.

1.4. Fertilisation of the ovum.

1.5. Tissue and organ changes in the mother in pregnancy.

1.6. Embryology and organogenesis.

1.7. Principles of genetics.

1.8. Applied anatomy of mechanical methods of preventing conception.

a—in female—chemical contraceptives, pessaries, IUCD, tubectomy.

b—in male—condoms, vasectomy.

2. Physiology.

2.1. Physiology of reproduction.

2.2. Endocrines and regulation of reproduction in the females.

2.3. Endocrines and physiology of reproduction in the male.

2.4. Physiology and endocrinology of pregnancy, parturition and lactation.

2.5. Nutritional needs of mother and child during pregnancy and lactation.

2.6. The safe period—rhythm method of contraception.

2.7. Principles of use of oral contraceptives.

3. Pharmacology.

3.1. Mode of action and administration.

(a) Chemical—contraceptives.

(b) Oral contraceptives.

3.2. Contraindications for administration.

3.3. Reactions and toxic effects.

4. Preventive and Social Medicine.

4.1. The need for Family Planning.

4.2. Organisation of Family Planning service.

4.3. Health Education in relation to Family Planning.

4.4. Nutrition.

4.5. Psychological needs of the mother, the child and the family.

4.6. Demography and vital statistics.

5. Obstetrics and Gynaecology.

5.1. Contraceptive methods Male—Female.

(a) Mechanical

1. Pessaries, IUCD, Condoms.

2. Tubectomy and Vasectomy.

(b) Chemical—

(c) Oral—

(d) Rhythm Method.

5.2. Demonstration of use of pessaries, IUCD, condoms, and technique of tubectomy.

5.3. Advice on Family Planning to be imparted to parents.

6. Paediatrics

6.1. Problems of child health in relation to large family.

(a) Organisation of Paediatric services.

(b) Nutritional problems of mother and child.

(c) Childhood diseases due to overcrowding.

7. Surgery

Technique of vasectomy.

8. Compulsory housemanship (Internship)

Placement of a student for in-service training in a family planning clinic for a period of at least one month.

9. Examinations.

It is necessary that questions of family planning be introduced in theory, practical and oral examination throughout the MBBS course.

The curriculum content has been indicated subject-wise. However, it would be more advantageous to the student for purposes of integrated learning, and for understanding of the subject, if family planning instruction within the curriculum content indicated could be divided into three phases.

Phase I

Introduction to Anatomy,

Physiology, Bio-chemistry and Pharmacology

There should be close integration in the teaching of these subjects. It is suggested that during the pre- and early para-clinical years, two to three weeks may be set apart for instruction in Family Planning relating to these subjects; so that the student gets an overall understanding of the principles and practice of 'Family Planning' within the limited time available for covering all the subjects of the medical course. The method suggested would save time and repetition of essential facts.

Phase II

This includes the later para-clinical and clinical courses. The practical aspects of family planning methods should be emphasised. This programme of instruction should be supervised by the Department of Obstetrics and Gynaecology and the departments of Preventive and Social medicine, Internal Medicine, Psychiatry, Paediatrics and Surgery unit be closely associated in imparting instruction, relating to the problems

arising from want of family planning, and the advantages to society and the individual which will be gained by adopting the measures suggested.

Phase III

Period of compulsory housemanship (Internship). During this period there must be one month's practical in-service training, during which period the student is attached to a family planning clinic.

Seminars. The medical colleges should organise occasional seminars in which staff from all departments and the in-service trainees should participate.

PHARMACOGCOLOGY INCLUDING PHARMACOTHERAPEUTICS

Teaching hours—about 285

LECTURES

I. General Pharmacology (8 lectures)

1. Definitions, Biological assay, biological standardisation, toxicity tests and therapeutic index.
2. Site of action of drugs and routes of drug administration.
3. Absorption, Fate and excretion of drugs.
4. Factors modifying drug action.
5. Drug combinations.
6. Mechanism of drug action.
7. Radio-active Isotopes and Radiations.

II. Systemic pharmacology

Autonomic Nervous system (10 lectures)

1. General considerations—Applied Anatomy and Physiology of autonomic nervous system.
2. Chemical mediators, receptors and classification of drugs.
3. Para—sympathomimetics.
4. Parasympatholytics.
5. Sympathomimetics.
6. Sympatholytics.
7. Ganglion blocking agents and drug interfering with release of adrenaline.

III. Central Nervous system—(17 lectures).

1. General and Theories of general anaesthetic actions.
2. General anaesthetics.
3. Methods of administration of Anaesthetics, Preanaesthetic medication and Basal anaesthetics.
4. Muscle relaxants.
5. Psychopharmacologic agents.
6. Alcohol.
7. Barbiturates and other hypnotics.
8. Antiepileptics.
9. Analgesics and Antipyretics.
10. Opium and its alkaloids.
11. Opium substitutes.
12. C.N.S. Stimulants.

Chemotherapy (16 lectures)

1. Sulphonamides.
2. Penicillins.
3. Broad spectrum Antibiotics.
4. General considerations of Antibiotic therapy.
5. Antitubercular Agents.
6. Antisiphilic and Chemotherapy of Leprosy.
7. Chemotherapy of Leishmaniasis and Trypanosomiasis.
8. Antimalarials.
9. Amoebicidal.
10. Antiviral agents.

Endocrinology (10 lectures)

1. Anti pituitary.
2. Post pituitary.
3. Thyroid gland and Hormones,

4. Antithyroid drugs.

5. Parathyroid.

6. Insulin.

7. Hypoglycaemic agents.

8. Sex hormones, Oral and Chemical contraceptives, Anabolic agents.

9. Cortical steroids and A.C.T.H.
Cardiovascular system—(4 lectures).

1. Digitalis.

2. Antiarrhythmic agents.

3. Coronary Dilators.

4. Hypotensive agents.

Haemopoietic system (4 lectures)

1. Haematinics—Iron, Folic acid and Vit. B. 12.

2. Coagulants and Sclerosing agents.

3. Anticoagulants.

4. Chemotherapy of cancer.

Skin and Mucous Membranes and G.I. Tract, (7 lectures).

1. Demulcents, Emollients, Adsorptives, Irritants and counter irritants.

2. Astringents, Volatile oils and Bitters.

3. Antacids.

4. Emetics, Antiemetics, Digestants.

5. Purgatives.

6. Drugs which act upon the liver—Hepatotoxic agents and choleretic agents.

Antiseptics and Disinfectants (2 lectures).

1. General Antiseptics and disinfectants.

2. Urinary Antiseptics.

Diuretics—(3 lectures)

1. Physiology, Osmotic diuretics and Xanthines.

2. Mercurials and anhydrase inhibitors and Benzothiadiazines.

3. Miscellaneous diuretics.

Respiratory system (2 lectures).

1. Carbon Dioxide, Oxygen.

2. Expectorants and drugs used in bronchial asthma.

Vitamins—(3 lectures).

Vitamins A, B-complex, C, D, E, & K.

Metals—(4 lectures).

1. Water and sodium salts.

2. Potassium salts, calcium and Magnesium.

3. Ammonia, Barium, silver, copper and zinc.

4. Gold, Arsenic, Mercury, Bismuth and lead.

Local Anaesthetic—(Lectures).

Cocaine, procaine and other anaesthetics.

Histamine Antihistaminics (2 lectures).

Anthelmintics (3 lectures).

1. General and Ankylostomiasis.

2. Ascariasis.

3. Oxyuriasis, Taeniasis and Schistosomiasis.

Miscellaneous (3 lectures).

1. Drugs used in diagnostic procedures. Vaccines and Serum therapy.

2. Enzymes.

Local hormones.

Pharmacy Lectures (7 lectures)

1. Pharmacognosy—2.

2. Incompatibilities—4.

3. Forensic Pharmacy.

Pharmacy Practicals.

1. Tests for alkaloids, glucosides and tannins.
2. Mixtures including lotions.
3. Emulsions, including liniments.
4. Powders.
5. Ointments.
6. Suppositories and pills.

Prescription Writing.

General principles and consideration of prescription in various conditions.

Lecture-Demonstrations.

1. Evaluation of drugs.
2. Choice of Animals, methods of Administration of drugs and anaesthesia in experimental pharmacology.
3. Physiological salt solutions and apparatus used in experimental pharmacology.
4. General Anaesthesia.
5. Effect of drugs when administered by different routes.
6. Effect of Parasympathomimetics and parasympatholytics on blood pressure and heart rate of dog.
7. Muscarinic and Nicotinic actions of Acetylcholine.
8. Effect of sympathomimetics on blood pressure and heart rate of dog.
9. Vesomotor reversal of Dale.
10. Effect of drugs on intact heart.
11. Effect of drugs on the isolated rabbit's heart.
12. Effect of drugs on the dog ileum *in situ*.
13. Effect on drugs on the respiration of dog.
14. Study of drugs acting on Nerve-muscular junction.
15. Study of Analgesics by rat tail-hot wire technique.
16. Study of Anticonvulsants, anticonvulsants.
17. Study of Antihistaminics by histamine aerosol in guinea pigs.
18. Tranquillizers.
19. Biological Assay.
20. Statistical analysis.

Experimental Pharmacology Practical (By the candidates themselves)

1. Effect of mydriatics and miotics on rabbits eye.
2. Effect of drugs acting on isolated rabbit's intestine.
3. Effect of drugs acting on perfused frog's heart.
4. Effect of drugs acting on frog's rectus abdominus muscle.
5. Effect of drugs on C.N.S. of rat.

NOTE :—Since it is envisaged that the pharmacology course should finish during 1st year of clinical year, in that case about 12 applied pharmacology lectures will have to be delivered during the last 2 years of clinical training especially to cover the management and use of drugs in well recognised disorders.

TEXT BOOKS**Pharmacology****Recommended.**

1. Pharmacology—J.C. David, V. Ishwariah and M. N. Guruswamy.
2. Clinical pharmacology—Laurence.
3. An introduction to pharmacology.

Reference.

1. Pharmacology and Therapeutics—Goodman and Gillman.
2. Pharmacology—Krantz and Carr.

FORENSIC MEDICINE AND TOXICOLOGY

Teaching hours—60

The Course consists of a series of lectures and demonstrations embracing :—

1. Legal procedure.

Definition of Medical Jurisprudence, courts and their jurisdiction, evidence, etc.

2. Medical Ethics.

Law relating to Medical Registration and Medical practice, Relation between the practitioner and the State; the practitioner and the patient. Malpraxis, Covering; professional secrecy; the practitioner and the various Acts. Provisional and Indian, such as workmen's Compensation Act, Leprosy Act, public health Act, Insurance Act, Child, marriage restraint Act, Borstal Schools Act, Lunacy Act, etc.

3. Forensic Medicine

Examination and identification of persons living and dead, parts, bones stains, etc.

Death, Medico legal post mortem, signs, stages and results. Putrefaction, Mummification, spaoification. Forms of death. Causes, agencies, onset, etc.

Assaults, Wounds, Injuries and death by violence.

Asphyxial deaths. Blood Examination :—Blood stains, Seminal stains.

Burns, scalds, lightning stroke, etc.

Starvation, Pregnancy, Delivery, Abortion, Infanticide.

Sexual crimes.

Insanity in relation to the state, Life and accident insurance.

Toxicology is a separate course of lectures in Toxicology dealing with poisoning in general, the symptoms and treatment of the various poisons, post-mortem appearance, tests, etc.

4. Medico-legal post-mortem.

Recording post mortem appearances. Forwarding material to chemical Examiner. Interpretation of Laboratory and Chemical Examiner's findings.

Students who are attending a course of lectures in Forensic Medicine, should avail themselves of all possible opportunities of attending medico-legal post-mortems conducted by the professor of Forensic Medicine.

5. Demonstrations.

1. Weapons.
2. Organic and inorganic poisonous substances.
3. Poisonous plants.
4. Skeleton for changes in age and sex.
5. Microscopic Examination of blood, Semen Hair, etc.
6. Tests for blood, semen, pregnancy.
7. Microscopic examination of post mortem material.

TEXT-BOOKS**Recommended**

1. Lyons Medical Jurisprudence for India, Graval (1953).
2. Medical Jurisprudence and Toxicology—Modi.

Reference

1. Taylor's Principles and Practice of Medical jurisprudence, London.

PATHOLOGY

Curriculum and outline of syllabus.

Teaching hours about—310

General pathology :

The teaching of general pathology should be considered from the point of view of making the student learn the basic principles involved in the reaction of the biological system in human beings towards inimical factors both internal and external, distributing normal physiological functions. The background information provided should enable the student to relate physical signs and symptoms to biochemical disturbances and morbid anatomical changes. The morbidity pat-

tern in the community should also be known so that special emphasis can be laid in presenting national and regional problems, thus illustrating how the disease process sets in, develops and how effectively either a natural arrest of the disease can be expected, or how beneficially the course of the disease can be controlled by rational treatment. With these objectives in view instructions in general pathology should be comprehensive and illustrative.

The topics for instruction should include, revision of normal structure and function and illustration altered state of the internal environment in relation to altered structure as a result of injury. This will necessitate dealing with the subjects in the following manner:—

1. Structure of tissues and cells—microscope and ultra microscopic details to be discussed in relation to physiological functions.
2. Alteration of morphology and function of tissues and cells. This should include changes in internal environment consequent upon vascular disturbances pathology of the injured cell and connective tissue.
3. Classification of causes of disease with particular reference to national and regional morbidity pattern.
4. General reaction to injury—inflammation, repair, immunity, hypersensitivity, auto-immune reaction.
5. General and specific reaction to diseases caused by parasites, fungi, bacteria, rickettsia, viruses, particulate matter, physical factors (temperature, altitude, sound, ionising radiation) chemicals.
6. Growth disturbances during childhood, adolescence and old age.
7. Deficiency states, and pathology of mal-nutrition.
8. Neoplasia.
9. Degeneration with special reference to aging, chronic exposure to adverse environmental conditions.
10. Genetics, and inheritance.

While combined exercises with clinical teachers in the ward will provide opportunities to illustrate the general principles of pathological reactions, the study should include simple exercises in experimental pathology to demonstrate evaluation of such important process as spread of inflammation, vascular disturbances, bacterial infections nutritional deficiencies, neoplasia etc. As far as possible demonstrations and discussions should replace the didactic form of teaching. Laboratory exercises and involvement of students in autopsies, hospital pathological services such as clinical pathology; laboratory services etc. will not only stimulate his interest in the study but will give him training in the scientific concept of medical practice. Presentation of case studies illustrating general principles of pathological reaction will further promote the scientific outlook of the medical student. During the course of his study training in modern methods of laboratory investigation to establish diagnosis based on signs and symptoms should be imparted. Wherever possible the historical aspects of evolution of knowledge and the lacunae in our understanding of disease process should be highlighted. Such an approach is essential for preparing the student to develop an enquiring mind, and to assist advances in medical sciences.

SYLLABUS

1. Aims and objects of the study of pathology; meaning of the terms, aetiology, pathogenesis, lesion and disease.
2. Degenerative processes
 - (a) Cloudy swelling or albuminous degeneration.
 - (b) Fatty degeneration with special reference to changes in the liver and heart. Feature and causes of fatty degeneration, staining methods for fat. (c) amyloid degeneration; differences between primary and secondary amyloidosis; nature of amyloid, causes of amyloid disease, changes in the viscera specially the liver, spleen and kidney. (d) hyaline degeneration. (e) mucoid degeneration (f) myxomatous degeneration.
3. Disturbances of metabolism
 - (a) Pigment metabolism endogenous,
 - (i) melanin and its disturbances.
 - (ii) brown atrophy of the heart.

- (iii) haematogenous pigmentation and its disturbances.
- (iv) malarial pigmentation.
- (v) jaundice, bile pigment metabolism, causes of jaundice, changes in blood and urine in jaundice.

Exogenous : (i) pneumokoniosis, silicosis and anthracosis (general principles only).

(b) calcium metabolism : metastatic and dystrophic calcification, differences between ossification and calcification, classification of.

4. Necrosis, definition, causes of necrosis, histological changes in the tissues in necrosis, types of necroses.

5. Gangrene, definition, nature and causes of the dry and moist gangrenes, gas gangrene.

6. post-mortem changes in the body, rigor mortis, post-mortem, decomposition including colour changes.

7. Circulatory disturbances (i) arterial and capillary hyperaemia. (ii) venous congestion; local venous congestion, acute and chronic; general chronic venous congestion and its causes; pathological effects of chronic general venous congestion, general effects and local changes in the lungs and liver, nutmeg liver, cardiac cirrhosis of the liver, brown induration of the lungs, heart failure cells. (iii) ischaemia. (iv) haemorrhage; effects of severe haemorrhage on the body. (v) shocks causes of shock; nature of shock, primary and secondary. (vi) thrombus; mechanism of thrombus formation common sites, ultimate fate of the thrombus including organisation and recanalisation of the thrombi pathological effects of thrombus; emboli forms of embolism sources of emboli formation, paradoxical embolism. (vii) Infarction; definition, tissue changes in recent and old infarcts; appearance of infarcts in the kidney, spleen, heart and lungs, causes of infarction in these organs. (viii) edema; factors causing generalised edema, mechanism of cardiac edema, renal edema, inflammatory edema and obstructive edema.

8. Inflammation definition of vascular phenomenon and its mechanism forms of inflammatory exudate and their different component parts including the various cells types, tissue changes in inflammation as a defensive process, varieties of inflammation, including allergic inflammation, differences of tissue reaction between acute and chronic inflammation.

9. Suppuration; nature of pus.

10. Mechanism of repair; healing of a clean incised wound, healing of an open wound.

11. Pathological principles of infection and resistance with special reference to host parasite relationship; results of infection such as to exaemia, bacteraemia, pyaemia and septicaemia.

12. Pathology of the following infections including a detailed description of special changes in the viscera as stated below :

(i) rheumatic fever; basic pathological lesion in the heart, (ii) pneumococcal infection; changes in the lungs, naked eye and Microscopic. (iii) bacillus typhosus infection; intestinal lesions (iv) dysentery; differences between the intestinal lesion of the bacillary and amoebic dysentery. (v) tuberculosis, nature of tissue reaction; genesis and fate of tubercle bacillus inside the body, method of infection and spread inside the body, nature of the primary and secondary infections in lung tuberculosis, Koch's phenomenon, tubercular ulceration of the intestines. (vi) leprosy general tissue reaction (vii) syphilis: natural history of the lesions in the primary secondary and tertiary congenital syphilis.

13. Growth and its disorders: atrophy, hypertrophy, hyperplasia, metaplasia, anaplasia, neoplasia, malformations.

14. Definition and general classification of tumours: characteristics of benign and malignant tumours methods of spread of malignant tumours, historical description of the following common tumours.

(a) benign leiomyoma, anginoma, papilloma, adenoma, fibroma, lipoma, chondroma and osteoma, cell carcinoma, carcinoma simple basal cell, carcinoma, sarcoma, especially fibrosarcoma and osteogenic sarcoma, teratoma.

15. Deficiency states and a pathology of malnutrition, vitamins C, B & F. Vitamin deficiencies, protein malnutrition Kwashiorkor.

16. Injuries caused by physical agents altitude, sound ionising radiation, chemicals, temperature, pathology of burns.

17. Heredity in disease: principles of simple dominant inheritance, simple recessive inheritance, sex-linked inheritance.

SPECIAL PATHOLOGY

1. The Pathology of the haemopoietic system can be covered to a large extent under 'clinical pathology'; alternatively haematology (in clinical pathology) can be covered while teaching pathology of the haemopoietic system, or even diseases of the haemopoietic system ("blood disorders") in clinical medicine, with the collaboration of the pathologist. Neoplasias and the neoplastic conditions of the haemopoietic system can be dealt with under general pathology.

2. The pathology of the cutaneous system would be best dealt with while teaching dermatology (in clinical medicine) and that of the skeletal system while teaching orthopaedics (in clinical surgery). Tumours of skin, muscle and bone should be mainly covered in "general pathology."

3. Renal function tests and the liver functions tests are best discussed with the help of a biochemist, while dealing with the pathology of diseases of the kidney and the liver respectively; similarly the investigations in a case of glycosuria (glucosuria) can be dealt with while discussing the pathology of diabetes mellitus. Alternatively, the clinical pathology of renal diseases, liver diseases and diabetes may be dealt while teaching renal diseases, liver diseases and diabetes, respectively in clinical medicine, with the collaboration of the pathologist and the biochemist.

4. The main training in autopsy work though it should go on throughout the period of all clinical teaching—should be intensified during the period when special pathology is being taught. The technique of autopsy may be finished, earlier while "general pathology" is being covered.

5. Clinico-pathological conferences should form an important feature at this stage; in fact they should be continued to the end of clinical terms. The conference should not only pertain to autopsied cases, but also include cases in which illustrative surgical specimens become available.

6. Symposia on common diseases are best arranged during the last two terms of the period of clinical teaching. The main participants in such symposia should be students, not teachers. The discussions should include anatomical, physiological, pathological and clinical aspects of a disease process.

7. While teaching "special pathology", the application of the fundamental principles in "general pathology", to special situation should be the objective. At the same time the students should be given glimpses of recent advances in principles while details should be omitted.

8. A major portion of "systematic microbiology can be covered while teaching special pathology and clinical subjects (with the help of a microbiologist).

9. At all stages there should be a close collaboration between the pathologist and the microbiologist in the teaching of "special pathology", especially in practical classes. For example, in the teaching of pulmonary tuberculosis the microbiology of mycobacteria should be a prominent feature, either as an introduction *de novo* or as a reiteration. Of course the techniques in microbiology should not be emphasised.

10. Lacunae in knowledge of disease process must be pointed out.

11. With the large number of students to be instructed—this is inevitable in the fact the inordinate increase in the number of admissions of didactic teaching will continue to form the mode of instruction. Newer techniques—like group discussions, for example are not possible on a large scale. Even the so-called tutorials will entail teaching large batches. A projector and projection slides would be invaluable under the circumstances, the slides should preferably be made from specimens available in the museum and should be in colour.

12. In teaching "special pathology", the commoner conditions should be emphasised. In our country prevalent nutritional disorders and the prevalent infectious diseases (even bacterial and parasitic) should continue to be emphasised. For example, avitaminosis leading to rickets, may have become

uncommon but nutritional megaloblastic anaemia (as opposed to Addisonian pernicious anaemia) is very common and must be dealt with in detail. Or, malaria may not call for detailed attention any more, but the study of parasitic infections, like amoebiasis, filariasis, ankylostomias and dracunculosis, should be gone into in detail. Nutritional disorders and the infectious diseases are possibly best dealt with under "general pathology". The pathology of aging must receive consideration either in general "pathology" or "special pathology."

13. The teaching "special pathology" is best done by the pathologist and not by the clinician. Further, "special pathology" must be taught as an extension of "general pathology." These opinions are expressed against the background of the conditions existing in our country the paucity of autopsies and the cursory interest taken by the clinicians in pathology. Of course it is assumed that the teaching of pathology will extend at least over 4 to 5 terms (of 6 months' each). As matters stand, in a separate examination in "special pathology" is an inevitable component of the teaching programme, it any, tangible benefit is to accrue from the undertaking. There could be a combined examination for "general and 'special' pathology" to be taught by the pathologist, 3 terms (of 6 months each) will not suffice, nor should it be taught while the learners have not advanced sufficiently in clinical medicine and surgery.

SYLLABUS

Lectures

1. Cardio-vascular system, Rheumatism, syphilis, valvular diseases and deformities, degenerative, inflammatory and allergic vascular lesions.

2. Gastro-Intestinal tract—Oral and oesophageal lesions, gastritis, peptic ulcer, gastric neoplasm, enteritis and intestinal neoplasm.

3. Liver Hepatic function tests, hepatic necrosis, post necrotic states of liver, infections and neoplasms of liver jaundice. Kidney diseases; nephritis, nephrosis, hydro-nephrosis, neoplasms and lesions of pelvis, ureter and bladder. Reticulo-Endothelial system—Structure and function of spleen, splenomegalies and lymph adenopathies.

4. Bones and Joints—Structure of bone, repair phenomenon inflammatory lesions neoplasms, deformities and diseases of joints.

5. Endocrines—Thyroid—Parathyroid Adrenal and pituitary, Nervous system—micro anatomy, infections, intoxications and neoplasms.

6. Male reproductive system—Infections and neoplasms of testes, diseases of penis and prostate.

Female reproductive system—ovarian functions, cyclical endometrial changes neoplasms of ovaries and uterus.

Breast—Hyperplastic states and neoplasms.

Practicals.

The training shall extend during the entire period of didactic teaching and shall consist of:

- (i) study of morbid anatomical specimens relating to the topics discussed in theory classes.
- (ii) study of minimum micro-sections, dealing with the disease processes of all the systems, their histopathological descriptions and diagnosis.
- (iii) Micro-sections relating to disease process outside the very common ones may be focussed for the whole class.

Clinical pathology:

1. Enumeration of white blood cells, leukocytosis, leukopenia.
2. Enumeration of red blood cells and haemoglobin estimation.
3. Classification of anaemias (broad principles only).
4. Differential W.B.C. count, Leishman's staining technique.
5. Knowledge of developmental forms of the erythrocyte and the white blood cells series. Appearances of peripheral blood smear in leukemias.
6. Erythrocyte sedimentation rate.

7. Blood grouping : principle and demonstration.
8. Urine Examination : (a) physical, (b) chemical, albumin sugar, acetone, urobilinogen, bile salts and bile pigments, bence-jones protein, detection of blood, (c) Microscopic examination.
9. Faeces examination : (a) Ova, Cysts red blood cells and pus cells. (b) Occult blood test, (c) Characteristics of the stool in Amoebic and bacillary dysenteries.
10. Gram—staining of bacteria.
11. Acid-fast staining of bacteria.
12. Basic knowledge of paraffin embedding technique for histological study.
13. Examination for parasites in peripheral blood.
14. Chemical pathology : examination of blood, urine, CSF and puncture fluids, with special emphasis on the interpretation on the liver and renal function tests and gastric analysis. Clinical significance of the data.

TEXT-BOOKS

Pathology

Recommended

1. Text book of pathology Boyd. William.
2. Text book of pathology Muir. R.
3. Text Book of pathology Banerjee D. N.
4. Morbid Anatomy Mitter
5. Pathological histology Roussey and Bertrand.
6. Post-mortem appearances Ross J. M.

Reference

1. Introduction to Tropical pathology Bhaskara Menon
2. Clinical Pathology Panton and Marrack
3. Surgical pathology Boyd. William.
4. Pathology of internal Diseases Boyd. William.

MICROBIOLOGY, PARASITOLOGY, IMMUNOLOGY
AND VIROLOGY, CURRICULUM AND OUTLINE
OF SYLLABUS

Teaching hours about 160

Each lecture class of 45—50 minutes duration should be followed by a lecture demonstration with animal experiments whenever possible, and a practical on the subject of the lecture. The lecture demonstration and practical may last two hours. Tutorials may be held approximately one hour per week during term time.

(A) General Bacteriology : Total time—15 hours.

1. Introduction and historical background.
2. Microscope.
3. Biology of Microbes
 - Bacterial anatomy
 - Bacterial physiology
 - Growth and death of microbe
4. Host-Parasite relationship & Fundamentals of Immunity.

(B) Medical Parasitology : Total time—18 hours.

1. Introduction to the study of Medical Parasitology & Rhizopodia.
2. Atrial flagellates
3. Haemoflagellates
4. Sporozoa & Toxoplasma
5. Nematodes
6. Cestodes
7. Trematodes

(C) Systemic Bacteriology : Total time 48 hours.

1. Systemic bacteriology & methods of identifying microbes.
2. Cornebacteria & Pfeifferella
3. Pyogenic cocci
 - Staphylococcus
 - Streptococcus
 - Neisseria
4. Mycobacteria
 - Mycobacterium tuberculosis

Anonymous mycobacteria Mycobacterium lepra
and
Miscellaneous mycobacteria

5. Enterobacteriaceae

Escherichia
Salmonella
Shigella
Miscellaneous gram negative bacilli.

6. Vibrio

7. Parvobacteria

Brucella
Haemophilus
Bordetella
Pasteurella

8. Bacillus and clostridium group

9. Spirochaetes

10. Chemotherapeutic & antibiotics agents against microbes.

(D) Immunology & Introduction to Genetics : Total time—
12 hours.

(E) Medical Mycology : Total Time—6 hours.

(F) Rickettsiae and viruses : Total time—12 hours.

1. Rickettsiae
2. Introduction of virology
3. Trich agents
4. Respiratory viruses
5. Exanthemata
6. Enteric viruses
7. Arbo viruses
8. Rabies and Miscellaneous
9. Bacteriophages

(G) Applied Microbiology : Total time—14 hours.

1. Normal Bacterial flora.
2. Laboratory diagnosis of upper and lower respiratory tract infections.
3. Laboratory diagnosis of diarrhoeal and dysentery disorders.
4. Laboratory diagnosis of urinary tract of infection.
5. Laboratory diagnosis of meningitis.
6. Laboratory diagnosis of pyogenic conditions.
7. Laboratory diagnosis of pyrexias of unknown origin.
8. Laboratory diagnosis of venereal diseases.
9. Serological tests used in Laboratory diagnosis.
10. The role of the laboratory in cross-infection.
11. Preventive inoculations.
12. Vehicles and vectors of Communicable Diseases.
13. Bacteriology of Milk, Water & Food.

(H) Tutorials : Total time—20 hours.

(I) Examinations : Total time—15 hours.

SUMMARY OF TEACHING SCHEDULE IN
MICROBIOLOGY

(A) Introduction and General Bacteriology	15 hours
(B) Medical Parasitology	18 "
(C) Systemic Bacteriology	48 "
(D) Immunology & Genetics	12 "
(E) Medical Mycology	6 "
(F) Rickettsiae and Viruses	12 "
(G) Applied Microbiology	14 "
(H) Tutorials	20 "
(I) Examinations	15 "
GRAND TOTAL	160 hours

Text-books recommended for under graduate students in Microbiology

Title of Book	Author(s) name	Name of Publisher
(1)	(2)	(3)
1. Whitby & Hyne's Medical Bacteriology	Hynes, M. J. & A. Churchill	Ltd., London.
2. Medical Parasitology	Sawitz, W. G. The Blakiston Philadelphia & Toronto.	

If no. 2 is not available Parasitology (Protozoology & Chatterjee, K.D. Published by the author, Calcutta in relation to clinical medicine.

The text books recommended for additional reading:

1. Medical Microbiology — Cruishank R. The English Language Book Society & E. S. Livingstone Ltd.,
2. Review of Medical Microbiology — Jawetz, Melnick Lange Medical Publications, Los Alton, E. A. California.

PREVENTIVE/SOCIAL MEDICINE**SUGGESTED SYLLABUS****Pre-clinical—60 hours total in 18 months.****Topics**

- I. *History of Medicines*—10 hours
 - Evolution of medicine through ages
 - Supernatural causes—Indian, Egyptian, Greek and Roman
 - Physical causes—medicine of middle ages—(600—1400 A.D.) Renaissance (1400—1600 A.D.)
 - Biological causes—bacteriological era
 - Social causes—development of social medicine.
 - Development and place of preventive medicine in present day medicine.
 - History of health practices in India.
 - The ancient age (650 B.C.—800 A.D.)
 - The middle age (800 A.D.—1800 A.D.)
 - The modern age (1800 A.D.—onwards)
 - Responsibility of a physician in a changing society.
 - place of the physician in modern society.
 - present health picture of the country & plan. (Lectures—10 hours)
- II. *Eugenics*—8 hours.
 - Fundamentals of eugenics
 - Mechanism of heredity
 - Transmission of characteristics
 - Recessive and dominant factors
 - Heredity and health
 - public health implications of heredity and diseases. (lectures 6 hours and seminar 2 hours)
- III. *Normal growth and development*—16 hours
 - Normal concept of growth & development.
 - Factors responsible for normal growth.
 - Role of nutrition and eugenics in growth.
 - Normal patterns of growth and development in India. (lectures 6 hours, practical 6 hours, seminar 4 hours)
- IV. *Bio-statistics*—18 hours (6 hrs. in pre-clinical period)
 - Introduction and difference between bio-statistics and vital statistics.
 - Use of statistical methods in medicine.
 - Sampling.
 - Collection of data, tabulation and presentation.
 - Interpretation of data.
 - Mean, median, mode.
 - Measurement of dispersion from the averages. (Lectures—8 hours, practical—10 hours) (12 hours in clinical period).

Para-clinical—160 hours total in 18 months.

- I. *Environmental sanitation*—50 hours total (30 in para-clinical)
 - Definition and importance.
 - Men's physical environments.
 - Water supply—sources.
 - Purification.
 - Water borne diseases.
 - Problems and approach for protection and provision of safe water supply.
 - Sewage composition and disposal.
 - Rural sanitation, pattern and problems.
 - Relation of insanitary environments with insanitary practices.
 - Sanitation of fairs and festivals.
 - Food sanitation.
 - Sanitation of cook houses and restaurants.
 - Rat and insect control. (Lectures—11 hours, field visits 27 hours clinical posting—4 hours, tutorials—4 hours. Practical—8 hours.)
 - *To be covered as field exercises. (20 hours in clinical period).
- II. *Elementary Social Sciences* (applied aspects)—32 hours total
 - Importance of medical practice in society.
 - Anatomy of society—
 - Family
 - Community
 - Neighbourhood
 - Functions of Society.
 - Differences between urban and rural society.
 - Religious and cultural factors in health & diseases. (Lectures—8 hours, field visits—24 hours)
- III. *Nutrition*—35 hours total (20 hours in para-clinical)
 - Definition and importance to health.
 - Food production and nutrition.
 - Factors responsible for nutritional deficiency.
 - Food fads and fallacies.
 - Culture and food practices.
 - Diet for an infant and toddler.
 - Diet for pregnant & lactating mother.
 - Diet for a normal adult.
 - Diet for an old man.
 - Diet and disease.
 - Applied nutrition programme. (Lectures—12 hours, practical—6 hours, field visits—9 hours, seminar—4 hours, tutorials—4 hours). (15 hours in clinical period)
- IV. *Health Education*—20 hours total (10 hours in para-clinical)
 - principles of learning.
 - What is health education, its importance in the medical field.
 - Channels of communication.
 - Use of media.
 - Group work.
 - Interviewing technique.
 - Place of health education in hospitals. (lectures—8 hours, practical—12 hours) (10 hours in clinical)
- V. *Medical entomology* :—22 hours total (15 hours in para-clinical)
 - Vector and diseases—economic aspects
 - Mosquitoes and diseases.
 - Flies and diseases.
 - Ticks and mites, how they spread disease.
 - Fleas and lice.
 - Approach to vector control. (Lectures—6 hours, practical 6 hours, field visits 3 hours, seminars—3 hours, tutorials—4 hours.) (7 hours in para clinical period).

VI. Industrial Medicine—23 hours total (15 hours in para-clinical)

- Historical background of industrial health.
- Occupational hazards (chemical).
- Occupational hazards (physical).
- Duties of a medical officer.
- Legislation in industries.
- Air pollution.
- Radiation hazards.
- Health of workers and laws.
- Health and industrial revolution.
- (Lecturer—9 hours, field visit 6 hours, seminar 4 hours, tutorials—4 hours.)
- (8 hours in clinical period.)

VII. Epidemiology—50 hours total (50 hours in para-clinical)

- Purpose and definition.
- History from ancient Greeks.
- Principles.
- Concepts.
- Natural History of disease.
- Levels of preventions.
- Communicable diseases.
- Non-communicable disease.
- (Lectures 30 hours, practical 6 hours, field visits 7 hours, seminars 3 hours, tutorials 4 hours.)
- Clinical—Total hours—200

I. Public Health Administration—16 hours.

- Our health problems today.
- Five year Plans—broad outline.
- National Health Programme.
- State of National Health services.
- International agencies.
- Role of voluntary agencies.
- Co-ordination of health services.
- Role of the general practitioner.
- Administration of food and drugs.
- Medical legislations.
- Hospital as a social system.
- Preventive aspects of hospital services.
- (Lectures—12 tutorials 4).

II. Maternal and Child Health—23 hours total.

- Historical evolution of M.C.H. care.
- MCH services in India.
- Maternal and child health problems.
- Principles of service.
- Organisation and staff.
- Concept of family welfare.
- Cultural features in maternal and child care.
- (Lectures 10 hours, field visits 8 hours, seminars 3 hours and tutorials 2 hours.)

III. School Health Services—19 hours total.

- Objectives and activities.
- School health programmes in India.
- Problems of the handicapped.
- Place of physician and teacher in school health.
- Health appraisal and health inspection.
- (Lecture 7 hours, field visits 8 hours, and tutorials 4 hours.)

IV. Primary Health Centre—10 hours total.

- Concept and physiology.
- Difference between hospital and primary health centre care.
- Organisation and staff.
- Comprehensive medical care.
- (Lectures 4 hours, field visits 6 hours.)

V. Social security—5 hours total

- Cost of medical care.
- Health insurance programmes and their benefits.
- Contributory health services.
- (Lectures 5 hours.)

VI. Family Planning—19 hours total.

- Demography.
- Channels of communication.
- National family planning programme.
- Knowledge attitudes regarding contraceptive practices.
- Population and growth and control.
- (Lectures 9, field visits 6 hours, tutorials 4 hours.)

VII. Vital Statistics—5 hours total.

- Importance of vital statistics.
- Rates and Ratios.
- Morbidity services.
- (Lectures 5 hours.)

VIII. Rehabilitation—9 hours total.

- Rehabilitation programmes.
- Geriatric rehabilitation.
- (Field visits 6 hours, clinical posting 3 hours.)

IX. Social Medicine—10 hours.

- Society and Medicine.
- The economic value of human life.
- Role of curative and preventive medicine.
- Medical care and social sciences.
- (Lectures 4 hours, field visits 6 hours.)
- Tutorials and seminars are conducted in the clinical period.)

TABLE II
Breakdown of hours according to the subject covered.

Topic	Total hours	Pre-clinical period	Para-clinical period	Clinical period
(1)	(2)	(3)	(4)	(5)
History of medicine	10	10	—	—
Eugenics	8	8	—	—
Growth and development	16	16	—	—
Biostatistics	18	6	—	12
Environmental sanitation	50	—	30	20
Social sciences	32	—	20	12
Nutrition	35	—	20	15
Health education	20	—	10	10
Medical entomology	22	—	15	7
Industrial medicine	23	—	15	8
Epidemiology	50	—	50	—
Public Health Admn.	16	—	—	16
Maternal & Child Health	23	—	—	23
School health	19	—	—	19
Primary Health Centre	10	—	—	10
Social security	5	—	—	5
Family Planning	19	—	—	19
Vital statistics	6	—	—	5
Rehabilitation	9	—	—	9
Social medicine	10	—	—	10
TOTAL	400	40	160	200

Large classes reduce the chances of discussion and as such reduce chances of fuller understanding of the subject. This is a matter of concern, as most of the students do not get the opportunity to observe and participate, in situations illustrating practice of social & Preventive medicine. A system of clinical posting has been recommended as in other clinical departments. This will provide the dual advantage of greater student participation in practical work and providing greater opportunities for small group discussions.

TEXT BOOKS

Recommended

1. Hygiene and public Health—B. N. Ghosh.
2. Text Book of public Health—W. H. Frazer.

Reference

Preventive Medicine and Hygiene—Resenan.

SUGGESTED CURRICULUM FOR CLINICAL SUBJECTS

General Remarks

The syllabus has been necessarily made comprehensive. However, in the general framework of this syllabus, the teachers can adopt a flexible approach.

No medical institution can impart all this teaching effectively in the limited duration of the undergraduate course. Therefore the proper selection of the subjects for the didactic lectures or clinical demonstrations has to be varied according to the importance of the subject and the availability of clinical material. Finally quite a substantial portion has always to be left to the students. They must be suitably trained to be able to learn on their own.

The main objective of the teaching in specialities like Ophthalmology, Otorhinolaryngology, psychiatry, Dermatology etc. should be to acquaint the students with the common manifestations of those disorders which are likely to be encountered in the day-to-day medical practice.

The clinical subjects should be presented in an integrated manner.

The teaching should involve disease as a whole and not as a medical or surgical problem etc.

For this purpose there should be coordination amongst teachers for the appropriate allocation of the subject-matter to be covered. This can be best approached in an integrated manner as in seminar teaching. However, if such a teaching method cannot be arranged, then the syllabus should be so planned at the commencement of clinical academic session that the repetition in teaching is avoided as far as possible. Many common items will be found in the syllabi of medicine and surgery. The above precaution is, therefore, absolutely necessary.

Emphasis should be to highlight the common problems that are met with in any geographic region. Recognition of emergency situations in clinical practice should be emphasised and principles of management of such conditions should be properly taught.

A correlation between the clinical presentation and the changes in the structure and function of various organs can only be achieved by effectively combining the clinical teaching with that in special (applied) pathology. This can also be brought out by attendance at post mortem examination as well as by participating in the microbiological examination of specimens obtained from the patients.

As regards specialities, at the undergraduate level students should get exposed to only the frequently encountered disorders so as to familiarize them with the problems which they are likely to come across during their practice as basic doctors. General principles rather than details should be dealt with. The main objective of training in special subjects is to enable the students to recognise such disorders early and to make the necessary referral for further evaluation and management to the specialist centres.

It should never be the aim to cover all possible details of general subjects as the teaching hours required for this vast expanding science of medicine can never be found. Subjects should be so arranged as to provide the basic knowledge of pathophysiology and its correlation with the common clinical problems. Rare diseases, details of infrequently used laboratory investigations and operative techniques should not be incorporated in the syllabus.

CLINICAL PHASE :

This phase of one and a half academic years, or 3 (three) academic semesters, after the completion of the second M.B., B.S. Examination, shall be devoted exclusively to the study of the following clinical subjects :

NOTE :—1. The study in these subjects shall also be taken up in the paraclinical phase alongwith the other subjects, and shall continue through the clinical phase.

2. These subjects, therefore, shall be studied over a total period of 6 (six) semesters.

(1) *Medicine* : inclusive of the following :—

- (a) a course of systematic instruction in the principles and practice of medicine;
- (b) a clinical clerkship in medicine for a period of 279 days;
- (c) a course of lectures, seminars of lectures, demonstrations in medicine and its specialities extending over a period of three academic years (six academic semesters) which shall run concurrently with the period of training in the other subjects;
- (d) a course of instruction in therapeutics, applied anatomy, applied physiology, applied pathology and radiology throughout the period of training in medicine.
- (e) attendance for clinical training at each of the following departments for a period specified against each :—

(i) Acute infectious diseases	2 weeks
(ii) Tuberculosis	2 weeks
(iii) Psychiatry	2 weeks
(iv) Dermatology & Venereology including Leprosy	2 weeks
(v) Radiology	2 weeks
(vi) Dietetics	2 weeks

NOTE :—Instructions in the subjects (i) to (vi) shall run concurrently with the course of instruction in medicine.

2. *Surgery* : inclusive of the following :—

- (a) a course of systematic instruction in the principles and practice of surgery;
- (b) a clinical clerkship in surgery for a period of 228 days.
- (c) a course of lectures, seminars of lecture demonstrations in surgery and its specialities extending over a period of three academic years (six academic semesters) which shall run concurrently with the period of training in other subjects;
- (d) a course of practical instruction in minor surgical methods including physiotherapy;
- (e) a course of practical instruction in minor surgery;
- (f) a course of instruction in applied human anatomy, applied physiology, applied pathology and radiology throughout the period of training in surgery;
- (g) attendance for clinical training at each of the following departments for the period specified against each :—

(i) Orthopaedic surgery	4 weeks
(ii) Anaesthesiology including instruction in the administration of anaesthetics.	2 weeks

NOTE :—Instruction in the subjects (i) and (ii) shall run concurrently with the course of instruction in surgery.

NOTE :—Each student during the period of clinical clerkship in the wards in medicine and surgery shall have continuously in his sole charge as clinical clerk not less than 5 clinical cases in each subject.

3. *Midwifery and Gynaecology* :—inclusive of the following :—

- (a) a course of systematic instruction in the principles and practice of Midwifery and Gynaecology;
- (b) a course of lectures, seminars, tutorials and lectures demonstrations in clinical Midwifery and Gynaecology extending over a period of three academic years, which shall run concurrently with the period of training in other subjects;
- (c) a course of instruction in applied anatomy and physiology of pregnancy and labour;
- (d) a clinical clerkship in Midwifery and Gynaecology for a period of 109 days, which shall be spent in the hospital wards and the outpatient department;
- (e) during the period of clerkship in Midwifery and Gynaecology wards, a continuous period of one month shall be spent as a student clerk during which a student shall be in residence in the hospital, and shall conduct at least twenty normal labour cases and witness at least five abnormal labour cases under adequate supervision;

- (f) during the period of clinical clerkship in Midwifery the student shall be instructed in the practical care of the new born by the department of paediatrics.

4. *Paediatrics*; inclusive of the following :—

- a course of systematic instruction in the principles and practice of paediatrics;
- a clinical clerkship in paediatrics for a period of 117 days in the hospital wards and out-patient department, during which six attendances at the well Baby-Clinic shall be compulsory;
- a course of lectures, seminars, lecture demonstrations in paediatrics extending over a period of three academic years which shall run concurrently with the period of training in other subjects;
- a course of instruction in paediatric therapeutics, developmental anatomy, physiology, pathology and radiology throughout the period of training in paediatrics.

5. *Ophthalmology and Otorhinolaryngology* :—

A. *Ophthalmology* : inclusive of the following :—

- a course of systematic instruction in principles and practice of Ophthalmology with main emphasis on the recognition and management of those disorders which are commonly seen in general practice;
- a course of instruction in preventive aspects of eye diseases;
- a clinical clerkship in ophthalmology for a period of 63 days in the hospital wards and out-patient department;
- a course of lectures, seminars, tutorials and lecture demonstrations in ophthalmology extending over a period of three academic years, which shall run concurrently with the period of training in the other subjects;
- a course of instruction applied anatomy, applied physiology and applied pathology throughout the period of training in ophthalmology.

B. *Otorhinolaryngology* : inclusive of the following :—

- a course of systematic instruction in the principles and practice of otorhinolaryngology, with the main emphasis on the recognition and management of those disorders which are frequently seen in general practices;
- a clinical clerkship in otorhinolaryngology for 40 days in the hospital wards and the out-patient department;
- a course of lectures, seminars, lecture demonstrations in otorhinolaryngology extending over a period of three academic years which shall run concurrently with the period of training in other subjects;
- a course of instruction in applied anatomy and applied physiology through the period of training in otorhinolaryngology.

6. *Preventive and Social Medicine* : Throughout the period of the undergraduate medical studies, the attention of the student shall be directed to the importance of the preventive aspects of medicine and the measures for the promotion of positive health. The course of instruction in social and Preventive Medicine shall start in the first semester and is continued during the 7th and 8th semesters of the clinical phase, when students shall attend preventive and social medicine department once in a week in the afternoons for the whole period of this academic year. During this clinical phase, the students shall have training in family care programme, with specific objectives to develop following :—

- Perceptive and accurate history taking;
- winning and holding confidence of patients;
- working with the medical health team and understanding of the role of community health resources;
- study of the role of physical, social, cultural, hereditary and emotional factors in health and illness.

GENERAL MEDICINE

Approach to patient History taking, physical examination of various systems, routine examination of clinical pathologi-

cal specimen, familiarity with the use of emergency procedure. Oxygen therapy, intravenous therapy, infusion of fluids, colloid solutions, blood transfusion, cardiac massage, artificial respiration etc.

Course of Lectures and Seminars should include the following :—

Infectious Diseases,

Bacterial-Staphylococcal, streptococcal, pneumococcal gonococcal, meningococcal, salmonella, bacillary dysentery, cholera vibrios, diphtheria, haemophilus influenzae, brucella, tetanus, tuberculosis, leprosy; Spirochetal syphilis, leptospirosis Rickettsial diseases common in India; viral disease common in India; Mycoses-histoplasmosis, moniliasis etc. clitoral infestations, ascariasis, trichinosis, hookworm disease, hydatid diseases.

Diseases of Blood and Blood forming organs :

(Diseases of haemopoietic organs)

The anaemias, iron deficiency, megaloblastic anaemia (nutritional), haemolytic anaemia polycythemia, leukaemia, leucopenia and agranulocytosis, bleeding disorders, purpura and coagulation defects; auto-immune diseases allied collagen diseases, anaphylaxis, allergy.

Reticulo-endothelial system :—

Lymphadenopathy, reticulosis.

Diseases of the kidneys and genitourinary system :—

Glomerulo-nephritis, nephrotic syndrome, pyelonephritis, tumours of G.U. tract urolithiasis, renal tubular disorders.

Metabolism :—

Inborn errors of metabolism water and electrolyte metabolism, disorder of acid and base excess or deficit. Obesity, porphyria, gout, deficiency diseases—(vitamins/undernutrition, protein caloric deficiency), dysproteinemias.

Endocrine :

Diabetes mellitus, hypoglycaemias, thyroid disorders, goitre hyperthyroidism, hypothyroidism, thyroiditis, tumours of thyroid, pituitary disorders, acromegaly hypopituitarism, diseases of parathyroid-hyper and hypofunction, adrenal disorders, adrenogenital syndrome, Cushing's syndrome Addison's disease, gonads; hypogonadism sterility, sex chromosomal anomalies, menstrual disorders.

Locomotor system :—

Arthritis osteoporosis and other bone dysplasias.

Cardio Vascular System.

Cardiac arrhythmias, congenital heart diseases, rheumatic fever and rheumatic heart disease, chronic valvular diseases, congestive heart failure, bacterial endocarditis atherosclerosis, coronary artery disease, essential and renal hypertension, hypertensive heart disease, myocardial diseases, pericardial diseases, peripheral vascular diseases.

Respiratory System :—

Diseases of upper respiratory tract diseases of bronchi bronchitis, bronchiectasis, pneumonias, pulmonary suppuration, emphysema disorder of pulmonary circulation, industrial lung diseases, pulmonary tuberculosis, pulmonary neoplasms, diseases of the pleura, cor-pulmonale.

Alimentary System :—

Diseases of upper G.I. Tract, oesophageal disorders, gastritis pepticulcer, neoplasms of stomach, diseases of small intestines, malabsorption tuberculosis, intestinal obstruction, diseases of large intestine (Dysenteries, ulcerative colitis, diverticulosis, constipation), intestinal neoplasms, appendicitis, peritonitis; diseases of liver and gall bladder—jaundice, hepatitis, cirrhosis, hepatomegaly echolecystitis, diseases of pancreas, pancreatitis, tumours of pancreas.

C.N.S.

Epilepsy, vascular infections of C.N.S, infections of meninges, brain abscess intra-cranial tumours, degenerative disorders of C.N.S. demylinating diseases, common diseases of spinal cord, pott's disease and compressions, diseases of peripheral nerves and muscles.

Psychiatry :—

Mental deficiency, dementia, depression, schizophrenia, paranoia allied states, anxiety state, hysteria, addictions, intoxications, psychosomatic manifestations.

Environmental/physical :—

Effects of altitude, radiation, heat and cold, motion sickness, electric injuries, poisoning-heavy metals, drugs etc. carbon monoxide poisoning, snake venom poisoning, food poisoning, alcoholism lathyrism.

Diseases of skin :—

Pyogenic infections, fungal infections, parasitic infection, eczema, allergic and erythematous conditions, urticaria and purpura.

Instead of formal teaching following may be actually demonstrated in the wards of O.P.D. and students familiarised with clinical aspects only :—

Chronic Bullous eruptions squamous dermatoses, Lichenoid dermatoses, pigment disorders, epidermal and dermal tumours, diseases of hair and nails.

Ophthalmology :—

Methods of examination of eye should be taught and demonstration on use of various ophthalmic instruments familiarised; formal teaching may include common types of conjunctivitis trachoma, corneal ulcer and other common affections of extra ocular structure; Glaucoma, iritis ciliary diseases and disorders of lens (mainly cataract); introduction to refractive errors, squint; injuries to eye, principles of first aid in the management of such injuries; involvement of eyes in systemic diseases such as nutritional disorders, hypertension, diabetes mellitus and other metabolic disorders; neurological states affecting eyes including retrobulbar neuritis, demyelinating diseases and papilloedema.

SUGGESTED UNDERGRADUATE CURRICULUM FOR PAEDIATRICS.

Child health should be considered as dealing with the total health of the child, covering the biological period characterised by growth and development.

The medical curriculum should therefore, emphasise, age-dependent variations in anatomical structures, physiological functions, pathological responses, immunological reactions and therapeutic tolerance. Clinical training should be, need-based and problem-oriented stressing the common diseases of infancy and childhood in the South East Asia Region. Students should be encouraged to define local problems, to seek solutions and to consider methods of prevention at both the individual and the community level. Clinical teaching should again emphasise growth and development, the factors which influence maturation and the developmental factors in health and disease. Problems of new born and premature infants should be necessary component of training as should also be causes of behaviour problems and their management.

Important topics to be covered in the curriculum should include preventive health programmes, immunization and nutrition services, well-child supervision and the care of physically handicapped, emotionally disturbed, dependent and delinquent children. These topics should be taught in association with the department of preventive and social medicine. In this combined teaching, consideration should be given to using the method of assigning each student to a family, enabling him to study the growing child in its family setting, in order to observe growth and development, early deviation from the normal and the effect of the environment on health. Period of clinico-social care may further focus attention on the influence of the social milieu on child health.

The central theme of the teaching process should be clinical exercises emphasising the natural history of disease in the growing human being which would offer the study and exceptional opportunity to develop his powers of observation and analysis.

SUGGESTED OUTLINE

Preclinical phase

Teaching integrated with physiology, anatomy and biochemistry to highlight developmental variations.
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Para-clinical phase :

(a) Didactic teaching integrated with pathology, microbiology and pharmacology to emphasise age dependent factors—8 hours.

(b) Clinical clerkship in paediatrics—to introduce developmental aspects of clinical methods and child health—4-6 hours.

Clinical Phase :

(a) Didactic instruction in child health—40 hours.

(b) Integrated teaching with other clinical areas (infectious diseases, haematology, renal and hepatic gastrointestinal disorders—12 to 16 hours.

(c) Clinical clerkship in paediatrics—8 to 12 weeks.

Internship :

Compulsory internship in paediatrics—4 weeks.

GENERAL SURGERY

History taking; physical examination; dressing; sterility, sterilisation; antiseptics; inflammation; repair; phogenic infections cellulitis, abscess, boil erysipelas; carbuncle, liver; hydatid disease, actinomycosis; primary and metastatic liver tumours.

Gall Bladder, Bile Ducts

Inflammation; calculi, obstructive jaundice, stricture of CBD, cholecystolithiasis and biliary atresia.

Pancreas-Spleen

Cong. malformations, injuries; pancreatitis; pancreatic cysts; pancreatic tumours; hyposplenism; portal hypertension. *Intestine.*

Intestinal obstruction in adults and neonates; volvulus, intussusception; appendicitis; carcinoid of appendix; peritonitis (acute); Crohn's disease, perforations ulcerative colitis diverticulosis, actinomycosis, amoebiasis; tuberculosis of intestines, peritoneum and mesenteric lymphnodes; abdominal hernia; femoral hernia; hiatal hernia; cong. malformation malrotation of gut atresia, anorectal anomalies, meconumileus; Hirschsprung's disease rectal inertia; benign and malignant tumours of colon and small bowel, multiple polypoid colostomy; minor ano-rectal diseases, like fistula, fissure, pilonidal sinus, polyp, abscesses stricture; prolapse rectum; carcinoma rectum and ana canal; benign tumours of rectum and canal.

FAMILY PLANNING

Technique of Vasectomy and restoration of vasal continuity-complications-management.

Genito-Urinary

Tests of renal function, radiological examination, endoscopy, lymphangitis, lymphadenitis sinus fistula; wound infection and infected wounds, management; infections of hand; gas gangrene; accidental wounds, principles of management, tetanus-preventive and curative; Burns classification, pathology, local management and systemic management; Blood transfusion, groups, reactions, procedure; fluid and electrolytes, body fluids, fluid and electrolyte balance and disturbances of, effect of operations and trauma; acid base balance transfusion solutions haemorrhage-primary, secondary, reactionary; shock, clinical features, physiological causes and management; crush syndrome; Tumours and cysts, venereal diseases-syphilis, gonorrhoea; lymphogranuloma venereal warts; chemotherapy in surgery, antibodies, resistance, selection, of agent methods of administration, laboratory control, prophylaxis; radiotherapy and anticancer drugs, radium "ionising radiation" skin tumours; radiology as a diagnostic aid, protection from radiation

Abdomen

Surgical anatomy of the abdominal wall, peritoneum, and abdominal viscera-their blood supply, lymphatic drainage, nerve supply and functions; abdominal incisions; abdominal injuries.

Stomach

Congenital pyloric stenosis, foreign bodies; volvulus, acute dilatation; gastritis; peptic ulcer, and its complications, tumours of the stomach.

Duodenum

Atresia, duodenal ileus, diverticulae, fistulae, tumours.
Liver and Biliary Tree

Injuries of the liver; liver abscess; amoebic infections of,

Kidney & Ureter—

Developmental abnormalities; closed renal injury; hypernephroma. Wilms' tumours, papilloma and epidermoid, carcinoma of renal pelvis; urinary calculi; calculus anuria; hydro-nephrosis; renal cysts; polycystic kidney; pyelitis, pyelonephrosis, pyelonephritis; renal carbuncle; G.U. tuberculosis, urinary fistulae.

Urinary Bladder—

Ectopic Vesicae, calculi, enuresis, traumatic rupture of bladder, urinary fistulae; extravasation; cystitis; bladder tumours; bladder neck obstruction; neurogenic bladder.

Prostate—

Senile enlargement; carcinoma; prostatitis.

Testis—

Undescended testis and testicular ectopia, torsion testis; epididymo-orchitis; testicular tumours; gumma; spermatocele, hydrocele; haematocoele; elephantiasis scrotum; filarial lymphangitis.

Urethra—

Urethral valves, hypospadias, epispadias.

Penis—

Phimosis, paraphimosis, injuries; papilloma, carcinoma, stricture urethra.

NEUROLOGY

Surgical anatomy of central nervous system; scalp wounds and hematomas; fractures of the skull; cerebral injuries, irritation, concussion; traumatic and spontaneous intra cranial haemorrhages; intra cranial infections; symptoms and signs of raised intra cranial pressure and investigations; intra cranial and cranial tumours; spinal block and compression paraplegia; trigeminal neuralgia, phantom limb, spina bifida, hydrocephalus; stereotaxis.

Head and Neck

Salivary glands infections, calculi, salivary fistulae; sialosis; tumours of salivary glands; ectopic, tumours.

Oral Cavity lips

Benign tumours, leukoplakia, cysts; oral cancer.

Jaws—

Tumours of the jaws; osteomyelitis, actinomycosis.

Thyroid—

Surgical anatomy investigations of goitres; cong. anomalies, ectopic thyroid thyrotoxicosis; thyroiditis, goitre; thyrotoxicosis, myxoedema; tumours of thyroid.

Others—

Cystic hygroma; branchial cyst and fistula; cervical lymphadenitis, tuberculosis of cervical nodes, actinomycosis; cancer in cervical lymphnodes; carotid body tumours, acute infections; Ludwig's angina

Adrenals and parathyroids—

Investigation of adrenocortical disorder and tumours, Cushing syndrome, adrenogenital syndrome, pheochromocytoma, neuroblastoma and ganglioneuroma; investigation of a case of hyperparathyroidism, primary hyperparathyroidism.

BREAST

Surgical anatomy, congenital abnormalities, acute mastitis and abscess; tuberculosis; non-specific infections; galactocoele, plasma cell mastitis; fat necrosis; fibroadenosis, gynecomastia; fibroadenoma; duct papilloma; paget's disease, carcinoma, sarcoma, radical mastectomy.

CARDIOTHORACIC

Surgical anatomy of pleura, lungs, heart, oesophagus, mediastinum and diaphragm; diagnostic procedures, bronchoscopy,

oesophagoscopy, bronchogram; injuries of ribs and sternum, pneumothorax; haemothorax; penetrating chest wounds; empyema; tubercular empyema; lung abscess, bronchiectasis, tuberculosis, hydatid disease; carcinoma of the lungs and bronchial tree; benign tumours; myaesthesia gravis and tumours of thymus; mediastinal nodes, tubercular, neoplastic; ectopic thyroid; cardiac arrest; elementary knowledge of cardiopulmonary by-pass, coarctation of aorta, patent ductus, anomalies of major vessels, congenital heart disease, cyanotic and acyanotic, rheumatic heart disease, aortic stenosis and incompetence, surgery for angina; aneurysm of the heart, thoracic aorta; cong. atresia of oesophagus; cardio spasm; pharyngeal diverticulum, strictures of oesophagus; carcinoma of oesophagus.

PERIPHERAL VASCULAR DISEASES

Athero sclerosis, thrombo-angitis, reynauds phenomenon; investigation of an ischaemic limb; arterial aneurysm; arterio-venous fistulae; gangrene; cold injuries, vascular tumours; varicose veins; thrombo phlebitis; phlebothrombosis, venous embolism. Lymphoedema.

Plastic Surgery

Principles of skin replacement; elementary transplantation immunology; cleft lip and palate, other congenital malformations of the face; maxillofacial injuries; skin tumours, haemangioma; keloid; basal cell carcinoma; melanoma.

ORTHOPAEDICS

Congenital deformities, spinal, club foot, flat foot, genu valgum, acute fractures and dislocations; (Colles's, supracondylar spine, pelvis, neck femur, ankle); healing of fractures; pathological fractures, recurrent dislocation of shoulder; principles of management; complications of fracture; osteogenesis imperfecta; marble bones; osteitis deformans; fibrocystic bone disease; diaphyseal aclasia; dyschondroplasia; scurvy; rickets; tuberculosis, spine and pott's paraplegia, hips, knee ankle, shoulder, wrist osteomyelitis and septic arthritis; bone tumours; Hip joint, congenital dislocations slipped epiphysis, porth's disease, osteoarthritis, knee joint-loose bodies, recurrent dislocation, cartilage injuries, Hand-Tendon injuries, Volkmann's ischaemic contracture, tenosynovitis, rheumatoid arthritis, congenital abnormalities, Dupuytren's contracture, carpal tunnel syndrome. Spine, scoliosis, congenital abnormalities, meningocoele, spondylolithesis, osteoarthritis, ankylosing spondylitis, lesions of intervertebral discs, cervical rib syndrome, anterior poliomyelitis, cerebral palsy; peripheral nerve injuries; amputation, rehabilitation, and artificial limbs; tumours of bone.

Obstetrics

Normal pregnancy : Sex cycles, ovarian and uterine; sex hormones, ovarian, pituitary and placental; maturation and fertilization of the ovum; early development of the zygote (fertilized Ovum) implantation of zygote and decidua formation, formation and functions of the placenta and chorion; amnion, umbilical cord and foetus; foetal circulation, blood formation and general physiology; the gravid uterus; general physiology; diagnosis; normal duration, multiple pregnancy antenatal care.

Abnormal pregnancy

Minor ailments : hyperemesis gravidarum; abortion; miscarriage; uterine moles; extra-urine (ectopic) gestation; infections of the urinary tract; anaemias; blood incompatibilities; glycosuria; diabetes, mellitus; pre-eclampsia; essential hypertension-chronic nephritis, eclampsia; jaundice; icterus gravidarum; general disorders, disorder of the genital tract.

Normal Labour

Onset; stages; anatomy and physiology and 1st and 2nd stages; the foetus; the forces; anatomy and physiology of the 3rd stage, mechanism; management; control of pain; uterine stimulants; delivery of foetus and placenta;

Abnormal Labour

Occipito-posterior positions of the vertex; face and brow presentations; breech presentations; transverse lie; twin labour; prolapse of cord and limbs; pelvic contraction; ovarian and uterine tumours; rigidity of cervix and pelvic floor abnormality of uterine action; obstructed labour; maternal injuries

in parturition; antepartum haemorrhage; postpartum haemorrhage.

The Puerperium :

General physiology; management; infection; inflammation of breasts; chorion epithelioma; breast feeding; post partum sterilization; post natal care.

Obstetric Operations :

Termination of pregnancy; version obstetric forceps; caesarean section; destructive operations of foetus.

Gynaecology :

Gynaecological case taking, puberty, clinical features of menstruation, climacteric and menopause; physiology of menstruation and sex hormones, outline of the embryology of the female genital organs; The anatomy and physiology of vagina and external genitalia; menstrual disorders; sterility vaginismus, dyspareunia and birth control; retroversion, genital prolapse, hypertrophy and elongation of cervix; old complete perineal tear, rectovaginal fistula, chronic inversion of the uterus, some neurologic disturbances in gynaecology, congenital anomalies in the female genital tract, infection of the female genital tract, the anatomy of the uterus, benign tumours of the genital tract, malignant disease of the female genital tract, ovarian cyst and tumour, broad ligament cyst and tumour, back ache, leucorrhoea pruritus vulvae, and vulval ulcer; gynaecological operations; post operative care and complications; discussions on gynaecological clinical cases.

SPECIALITIES—SUGGESTED SYLLABUS

Ophthalmology :—

Course of study :—

I. A Course of 15 lectures on diseases of the eye. Ocular injuries, foreign bodies, sympathetic ophthalmia, eyelid injuries, eyesigns in head injuries; corneal ulcers; inflammations uveitis-panophthalmitis, endophthalmitis, orbital cellulitis dacryocystitis; conjunctivitis; vernal catarrh; trachoma; cataract; ocular muscle paralysis, squint; ocular tumours and tumours of adnexa; tarsorrhaphy; glaucoma, acute and chronic; ocular manifestations of general disease; fundus examination, field of vision, elements of refraction, colour vision; common causes of blindness, nutritional, exanthemata, trauma, prevention of blindness.

II. A course of 10 demonstrations.

- (1) refraction and use of ophthalmoscope and other ophthalmic instruments,
- (2) external examination of the lids, lachrymal apparatus, conjunctiva, cornea, sclera, anterior chamber, iris, pupil & lens,
- (3) tonometry,
- (4) elementary optics-reflection by concave, convex and cylindrical lenses, refraction by prisms,
- (5) elementary physiological optics, cardinal points of the eye,
- (6) accommodation its, range and amplitude,
- (7) aberrations, spherical and chromatic,
- (8) visual acuity-theory and practice;
- (9) distant vision, determination of accommodation and tests for near vision,
- (10) field of vision, central and peripheral.
- (11) use of perimeter,
- (12) retinoscopy, its theory and practice,
- (13) Ophthalmoscopic examination, preliminary examination with plain mirror,
- (14) indirect and direct ophthalmoscopy,
- (15) principles of determination of visual balance,
- (16) paralytic squint,
- (17) diplopia,
- (18) Principle of determination of paralysed muscle or muscles,
- (19) concomitant strabismus.

III. An attendance of two months in the out-patients Departments.

(1) Attendance in various branches of this department e.g., refraction department recording distant and near vision, doing retinoscopy, prescription of simple glasses like presbyopic correction and spherical myopic lenses, examination of normal and abnormal fundus.

(2) Minor operation room assisting in the removal of foreign bodies, sub-conjunctival injections, cauteries and taking of ocular tension etc.

(3) Dressing room conduction of ophthalmic dressership.
EAR, NOSE & THROAT (OTORHINOLARYNGOLOGY)

Ear—Anatomy and congenital malformations of external, middle and internal ear; injuries, otitis externa, media, labyrinthitis; mastoiditis; tuberculosis, syphilitic and secretory otitis media; Menieres' disease, vestibular neuronitis; injuries of internal ear; deafness, perceptive and conductive, methods of investigation, otosclerosis, hearing aids; ear neoplasms.

Nose—Anatomy, relation to orbit and teeth, congenital malformations, injuries, foreign body and rhinolith; epistaxis; sinusitis, orbital and intra-cranial complications; allergic rhinitis; rhinitis acute, chronic tubercular, rhinoscleroma, non-specific rhinitis; atrophic rhinitis, polypi; diseases of nasal septum, diseases of the vestibule of the nasopharynx, tumours of nose and paranasal sinuses;

Throat—Anatomy of throat, congenital malformations and injuries; pharyngitis, diphtheria, submucous fibrosis; adenoids and tonsils; neoplasms of nasopharynx, oropharynx.

Larynx—Anatomy, congenital malformations, injuries, specific and non-specific inflammations; tracheitis; oedema; tuberculosis; foreign bodies in trachea and oesophagus; tracheostomy; neoplasms of larynx; neurological disorders of larynx;

Clinical Instruction : Physical examination and investigation, diagnosis and treatment of diseases of E.N.T. practical demonstration of nose operations e.g. sub-mucous resection maxillary sinuses, puncture, tonsilectomy, adenoidectomy, retro-pharyngeal abscess, tracheotomy, mastoidectomy, transillumination.

The clinical posting for a period of 4 weeks during the 2nd surgical O.P.D. posting.

Anaesthesia.

A series of 10 lectures and instructions in the theory and practice of anaesthesia, comprising of the following :—

1. Principles and stages of general anaesthesia,
2. Properties and actions of various types of anaesthesia, their selection,
3. intravenous anaesthesia, its techniques and drawbacks,
4. untoward incidents during anaesthesia,
5. post anaesthetic complications and their treatment,
6. spinal and epidural analgesia and their complications, local analgesia and its techniques,
7. Special techniques involving the use of curare and other muscle relaxants and pre-and post-operative medication.

The candidate must be certified of having personally administered anaesthetic on at least ten occasions and of having maintained a detailed record of these cases.

Dermatology and Venereal Diseases

The course of studies will be as follows :

Lectures—There will be a minimum of ten lectures.

- (1) general anatomy, physiology of the skin,
- (2) diseases of skin caused by physical, chemical radiation; bacterial and parasitic agents viz., scabies, pediculosis etc.
- (3) tinea infection,
- (4) virus infection,
- (5) herpes and dermatosis of uncertain origin including Eczema, Psoriasis, allergic conditions,
- (6) Syphilis, congenital and acquired,
- (7) Chancriod, infection,
- (8) Gonorrhoea and other less common venereal diseases like Lymphogranulom venereum, Granuloma inguinale, non-specific urethritis and herpes progenitalis.

(a) Preventive aspects of venereal diseases Hospital posting—There may be a clinical clerkship in the department of skin and V.D. including O.P.D. for a period of four weeks during the second surgical O.P.D. posting.

Mental Diseases

A course of ten lectures and ten demonstrations on mental cases in a mental hospital

1. normal and abnormal behaviour, suggestion, aggression sublimation, inferiority, feeling, delusion, illusion, hallucination and phantasy.
2. Psychopathology—classification and general symptomatology.
3. Principal types of mental disorders.
 - (a) Failure of mental development, idiocy, imbecility, feeble-mindedness, moral imbecility.
 - (b) melancholia, stupor, mania, depressive psychosis (alternating and circular insanity).
 - (c) chronic systematized delusional insanity, paranoia.
 - (d) parasymphilia, general paralysis of the insane, schizophrenia dementia, secondary and senile (5) confusional psychosis, schizophrenia, exhaustion psychosis, from privation or post-puerperal-insanity.
 - (e) epileptic insanity.
 - (f) psychoneurosis-neurasthenia, hysteria, psychoasthenia, anxiety state.

4. *Medico : legal aspects of insanity*. Feigned insanity, Law and mental disorder, Admission into mental hospital, certification, criminal and civil responsibility, Testamentary capacity.

5. Treatment, general, institutional psychoanalysis, throughout the whole period of study, the attention of the student should be directed by the lectures to the importance of preventive aspect in the early stages of mental disorder.

Tuberculosis

Lectures :—These will consist of a series of about ten lectures on the various aspects of tuberculosis. The lectures will comprise of aetiological and immunological principles of tuberculosis including.

1. allergy,
2. incidence of infection and mortality rates,
3. classification of pulmonary tuberculosis, diagnosis, investigations, complications.
4. medical and surgical treatment of various types of tuberculosis including domiciliary and sanatorium treatment.
5. preventive aspects of the problem and the importance of tuberculin test and B.C.G. inoculation with practical demonstrations.

Hospital posting :—students will be posted for clinical duties in the T.B. wards. During the period the students will not only learn the clinical aspect of pulmonary tuberculosis but will also be initiated the principles of fluoroscopy, methods of examination of sputum.

RADIOLOGY

The course in Radiology shall consist of about ten lectures and demonstrations in the Radiology department of the college. The lectures shall cover the following :—

Lectures

1. Principles of Physiotherapy—Discovery of X-ray and Radium and their biological properties. Role of Radiology and Radio-therapy in diagnosis and treatment.
2. Application of X-rays in medicine. Technical considerations. Methods of examination—fluoroscopy and radiography. Report-writing. Radiological nomenclature and interpretation.
3. Radiological investigation of thoracic cage diaphragm, heart and aorta, trachea, cricoid, lungs.
4. Methods of investigations of Alimentary tract-pharynx, oesophagus, stomach, duodenum, jejunum, ileum, caecum, appendix colon.

5. Cholecystography; pyelography, cystography etc. and their interpretation.

6. Radiological investigations of female genital organs.

7. Methods of investigation of neoplastic and congenital affections and trauma of skeletal system and joints. Determination of age and sex on X-ray findings.

8. Principles of arteriography and ventriculography.

9. X-ray therapy and Radium.

10. Principles of ultra-violet and infra-red therapy. Massage and other forms of physiotherapeutic treatment.

Dental diseases

Attendance at the course in the Department of Dentistry for a period of 15 days during which there shall be not less than six lecture demonstrations.

NEED-BASED UNDERGRADUATE MEDICAL EDUCATION

by

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Today medical education has reached a stage in its long history, when a departure from the traditional structure of the past has become almost imperative not only in developing countries, but also in developed countries. In September 1965 it was considered expedient in Great Britain to appoint a Royal Commission to review medical education, undergraduate and postgraduate in the light of national needs and resources, including technical assistance overseas to advise Her Majesty's Government on what principles future development, including its planning development, should be based. The Royal Commission which submitted its report in April 1968 made the following important recommendations in so far as the undergraduate medical education was concerned : (i) The duration of the undergraduate course should remain five years, (ii) The course should be as flexible as possible. Its content should be grouped into compulsory elements, options, and elements in which a choice may be made between a series of limited alternatives, (iii) A total period of about nine months should be available for optional courses in which a student could (after advice) broaden his acquaintance with several subjects or study one in greater depth. He should be able to spend this time in clinical subjects as well as the basic medical sciences, (iv) The undergraduate course and graduation should be followed by a compulsory year of internship similar to the present one but better controlled by the universities than now. This should preferably be completed by all students, including those from overseas, in the region adjoining their medical school, (v) Registration after satisfactory completion of internship, should enable the individual to practise under supervision, but should not entitle him to independent clinical practice in Britain.

In the United States, the basic medical qualification of M.D. can be obtained only after a four-year course in high school, a four-year course in college in which a candidate receives his pre-medical training in such subjects as chemistry, physics, biology, and another four-year course in a medical school. In addition to these academic requirements, prospective medical students are expected to take the Medical College Admission Test, which was developed in 1947 by the Association of American Medical Colleges. Generally two years of medical school would be devoted to the pre-clinical subjects and the remainder to the clinical fields.

Since submission of the Flexner report on medical education in 1910, medical education in the United States of America has undergone several changes. Probably the most important one pertains to the development of speciality training after medical school. According to the National Advisory Commission on Health Manpower, by 1967 less than two per cent of medical school graduates go into general practice. The vast majority continue their education

a ter graduation from medical school with a view to become specialists, teachers or research scientists. Today the completion of medical school and awarding of the M.D. degree thus represent not the termination but only a midway point in the education of the American physician. The emphasis on speciality training and research has also effected a basic change of the character of the American medical school, which has become a research and post-graduate education centre in addition to its erstwhile function of training undergraduates.

On the other hand there is a rising tide of feeling in the United States of America that medical education in all its phases is not keeping pace with the wants and needs of the population it serves to serve. Rising expectations, rising costs, maldistribution of services, inefficient organisation and utilization of facilities, the seemingly endless expansion of time required for education and training in the medical field, increasingly critical shortage of manpower, the continued production of experts and specialists and the great dearth of general medical practitioners, the overwhelming need for and the rational uses of medical technology, these and many other problems demand a more effective utilization of the great advances in medicine for the benefit of the common man even in an affluent and a highly developed country like the United States of America. There is also considerable dissatisfaction over the present training of the physician for his work in the community in European countries also.

Since our independence a number of Conferences on medical education have been held in India. During the discussions our educational policy has been criticised, as our undergraduate curriculum content is unrealistic and the methodology of undergraduate training does not conform to the rapidly changing advances in medical education, both from the point of view of expanding scientific knowledge and the great demands of a developing country with the problems of communicable diseases and population explosion. As a matter of fact, it has been felt that the pattern and content of the education programme should be so adjusted as to provide training for the practice of medicine in rural areas where over 80% of our population live. The 'basic doctor' should be conversant with the day-to-day problems of the rural and urban communities and he should be able to play an effective role in the curative, preventive and promotive aspects of regional and national health problems. There is, at present, a great ferment in the field of medical education regarding (a) selection of students, (b) the curriculum and content of education, (c) methods of teaching and (d) the type of examination.

The third conference of the Deans and Principals of the Medical Colleges held in New Delhi in August, 1967 made certain recommendations. These were considered by the Executive Committee of the Central Council of Health at its Third Meeting held on the 19th April, 1968 which recommended that there was a need to study all aspects of medical education in the wake of national needs and resources. It directed that a Committee should be appointed to consider the question of medical education in all its aspects. Accordingly the Government of India appointed a Committee with the following terms of reference :

- (i) to study all aspects of medical education and training of medical graduates in the light of national needs and resources;
- (ii) to consider the development of the undergraduate medical curriculum in relation to national requirements, the need for uniformity of syllabus, apportioning of the time between didactic and practical teaching, selection of entrants to medical colleges, reciprocity between various medical institutions and universities and domiciliary restrictions in the matter of admission to medical colleges.

The Committee submitted its report to the Central Council of Health which considered the report at its sixteenth meeting held in November 1969 at Bhopal and expressed its appreciation of the report as well as its approach for the re-orientation of the undergraduate medical education so as to turn out basic doctors who would be emotionally prepared and professionally competent to meet the needs of the community particularly that of the rural areas. The Council resolved that a full fledged conference of ministers officials, experts and vice-chancellors, be expeditiously called at Delhi to decide further course of action in the light of the report

submitted. Till this Conference considers the report and decides further course of action, it would not be proper for the author to discuss the recommendations in the report here, as he was a member of the Committee. For a similar reason the draft report of the Review Committee of the Medical Council of India on Undergraduate Medical Education cannot be discussed here till it is approved by the Executive Committee of the Medical Council of India on December 16, 1969 and by the Council itself later. However it is gratifying to note that there is wide range of agreement between the two reports and there is general consensus of opinion on the following broad principles :

1. The medical graduates who qualify from almost all the medical colleges show unmistakable evidence of not having been trained to satisfy the requirements of a 'basic doctor'. These graduates whose clinical training has been built round a frame-work of laboratory and other sophisticated investigations in a city hospital are placed in working conditions so far different from those they were used to in the institutions where they were trained and consequently they feel utterly helpless when they join a Primary Health Centre. They soon become complete misfits in rural areas where quacks flourish on the credulity and ignorance of the population.
2. The pattern of training in most medical colleges is still largely, oriented towards curative medicine, despite all efforts made by Government of India and the Medical Council to lay much greater emphasis on the preventive aspects of medicine in order to establish community health and thus bring down the cost of medical care.

There is still a very large gap between the actual requirement of doctors in rural areas and the number actually available for service in these areas. Apart from lack of basic amenities, conditions of service or private practice in rural areas are unattractive to many young graduates so that they flock round large cities for some time, but soon find it impossible to compete successfully with those who are already well established in private practice and migrate to other countries where emoluments are decidedly better and living conditions more attractive. It is understood that about 6,500 doctors are working in the United Kingdom and about 2,500 in the United States of America.

The Primary Health Centre Conference held in June 1967 made the following significant observation: "Reluctance of doctors to serve in rural areas is universal even in socialistic countries. Reasons are varied. They may be personal and family problems. Houses may be unsuitable with little or no basic sanitation facilities and no electricity. Roads may be bad with poor transportation facilities. There is a genuine fear of social isolation and professional voidness".

The fourth annual conference on the orientation of doctors to rural service held at Narangwal in November 1966 urged the Central Government to sponsor a bold and innovative approach to experimentation in medical education. In an appropriately chosen rural district a 'medical college without walls' should be established. Similar recommendations have been made more recently by the Working Group of Medical and Public Health Administration of the Administrative Reforms Commission.

As a matter of fact there is no dearth of such recommendations made by several big conferences and smaller committees for modifying the undergraduate medical curriculum in such a way as to produce good 'basic doctors' who will not only be clinicians and the rapists but also make their contribution in the preventive and promotive aspects of the health of the community. The real difficulty lies in implementing the various recommendations in a developing country like ours with limited financial resources, dearth of teachers in 94 medical colleges and the lack of even basic amenities such as residential accommodation, safe water supply and sanitary latrines in rural areas where the medical students and interns have to work to gain practical experience in comprehensive community medicine. During the Third Conference of Deans and Principals of Medical Colleges some deans and principals offered to train the medical students and interns in Comprehensive Community Medicine in rural areas, if suitable residential accommodation and other basic amenities could be provided for the staff, students and interns in rural areas.

Unfortunately, it has not been possible to provide accommodation for all the existing 4919 Primary Health Centres and residential accommodation even for the doctors, nurses and paramedical personnel working in these Primary Health Centres, due to limited financial resources in the States. Under these circumstances it will not be possible to provide the necessary pucca accommodation for the staff, students and interns from the medical colleges for the purpose of carrying out the above training programme. However, since it is absolutely necessary to give practical training in Comprehensive Community Medicine to our under-graduates and interns in rural areas and at the same time provide comprehensive health care including family planning to our hitherto neglected rural population, we would like to make the following proposals for the consideration of all concerned.

It is suggested that as a pilot project each State may select a suitable medical college and provide it with what we would like to call a 'Mobile Training-cum-Service Hospital' which should be fully equipped with the necessary vehicles, tents and all the other facilities to enable it to function, at least to begin with, as a good Mobile Hospital with 30 beds and with adequate accommodation in tents for all the staff members, 10 to 20 final year medical students 10 to 15 and interns. If this succeeds and when more funds are available it can be expanded to involve more and more medical colleges in a phased manner. As a matter of fact, the State of Rajasthan started in 1955 in a modest way a Mobile Surgical Unit mainly due to the drive of the dynamic Director of Medical and Health Services of the State at that time. The need for providing surgical facilities to rural Rajasthan was felt ever since the integration of the former princely States of Rajasthan, and it prompted the Government of Rajasthan to create a Mobile Surgical Unit in 1955. This Unit has been strengthened from time to time so that by 1967 it had become a 400-bedded Mobile Surgical Hospital fully equipped with modern operation theatre equipment and diagnostic aids such as: Mobile x-ray van, Mobile Dental Van, Mobile Laboratory, Mobile Blood Transfusion Unit and a Mobile Generator Van.

Thousands of patients swarm the camps of this Mobile Surgical Hospital and receive medical aid. Many of them are admitted for operations. Those patients who are considered bad risks for operation in the camp, are advised to seek admission in one of the Medical College Hospitals. It is noteworthy that in the mobile Surgical Hospital all investigations are completed in 72 hours and operations are done immediately after all the investigations. From 1956 to 1968, in the Mobile Hospital had been performed 20,561 eye operations, 10,444 surgical operations and 3,461 operations for family planning. Apart from catering the surgical needs of the patients, the Mobile Hospital imparts Health Education in all its aspects to the people through health exhibition film shows, motivation for family planning and immunisation, publicity for national health programmes, etc. In the out-patient department all types of cases are examined and treated. The operations performed in the Mobile Surgical Hospital include appendicectomy, gastrectomy, cholecystectomy, nephrolithotomy, lumbar sympathectomy, herniorrhaphy, mastoidectomy, hysterectomy and colporehaphy, apart from a variety of minor operations. Thus almost all operations performed in a large hospital are performed in this Mobile Hospital which also actively participates in the National Family Planning Programme in checking the population explosion. All the interns from the Medical Colleges in Rajasthan attend these camps.

The successful working of this scheme during the past fourteen years and the advantages gained by the under-graduates and interns of the Baroda Medical College by their senior and junior teachers accompanying them during their visits to the Primary Health Centre at Padra near Baroda have encouraged us to put forward the above proposal of attaching Mobile Training-cum-Service Units to Medical College. The training and service programme, which will be closely supervised by the senior and junior teachers of the concerned Medical College, may include the following:

(1) Out-patient clinic and laboratory examination, (2) home visiting for emergency medical care, imparting health education including motivation in family planning, (3) ante-natal clinic, (4) well baby clinic including immunisation, (5) specific morbidity surveys to ascertain disease and malnutrition prevalence and to organize action programme for its control, (6) collection of vital statistics, (7) involvement in

the national programmes for eradication or control of communicable diseases under the supervision of State Public Health personnel, (8) gaining first-hand knowledge and practical experience about the containment measures to be taken in the event of outbreaks of epidemics of smallpox, cholera, enteric fever, dysentery, etc. (9) domiciliary treatment of tuberculosis and leprosy and (10) assisting in the implementation of the applied nutrition, school mid-day meals and schools health service programmes.

It is important that the above mentioned activities should be carefully supervised by all the senior and junior teachers in the concerned medical college who may visit the Mobile Training-cum-Service Unit by turn and also the State Public Health personnel. At present only the teachers in the Department of Preventive and Social Medicine in a medical college go with the students to the Primary Health Centre attached to that medical college and spend a few hours there and return the same day. By implementing our proposal it will be possible to give training in comprehensive Community Medicine to medical students and interns by setting up the Mobile Training-cum-Service unit in tents in the midst of a group of villages. The staff members, students and interns have also an opportunity to live together in the camp and give a practical demonstration to the villages of setting up sanitary latrines at a reasonable cost, preventing contamination of existing wells, tanks and other sources of water supply and avoiding gastro-intestinal infections by drinking boiled water, milk, etc. The teachers from the medical college may, with advantage, be assisted by all the medical and paramedical staff both in the public health department in the district as well as those in the Primary Health Centre. As a matter of fact, the Primary Health Centre doctor and paramedical personnel will benefit a great deal by working in close cooperation with the team of teachers, students and interns from the medical college rendering comprehensive health service to the community.

At present the patient-load in every Primary Health Centre is so heavy that the doctor working in the Centre is unable to devote adequate time for preventive medicine, public health measures and family planning. If there is an additional lady doctor for family planning, she does not bother to devote any time for preventive medicine at all. Further, all these young doctors will benefit a great deal by the advice and guidance that will be available from teachers in clinical subjects and preventive and social medicine. Moreover, the patient-load in the Primary Health Centre will decrease appreciably since the teachers, students and interns will visit every home and treat the patients in their homes and send all the patients who require hospitalisation to the medical college hospital by an ambulance which must necessarily be included among the various types of vehicles, which will be needed for the Mobile Training-cum-Service Unit. As a matter of fact, we are preparing a detailed scheme in the Directorate General of Health Services containing concrete proposals with regard to the necessary staff, equipment, optimum number of students and interns in each batch and the period of stay for each batch in the Mobile Training-cum-Service Unit and the non-recurring and annual recurring cost of each unit. To begin with, this Unit may provide facilities for examination and treatment of out-patients who come to the Unit apart from carrying out the ten functions detailed above in close collaboration with the District Medical Officer, District Public Health Officer, District Family Planning Officer and all the medical and paramedical personnel under them.

It will be highly beneficial to all concerned if the teachers from the medical colleges hold periodically in the Mobile Units clinical meetings in which not only the students and interns but also the Primary Health Centre doctors and the medical officers in the Taluq and district headquarters hospitals can actively participate. This is what is badly needed for our young inexperienced doctors who are posted to the Primary Health Centres soon after they complete their internship. It is suggested that students in the final year of M.B., B.S. course may be posted for a suitable period agreed to by all concerned and the interns for a period of six months in a Mobile Training-cum-Service Unit. At least one physician, one surgeon, one obstetrician and a teacher from the department of preventive and social medicine should be with the students for one month and these may be rotated suitably so that everyone from the professor down to the lecturer in each department stays in the camp with the students and interns for one month depending on the staff available in each department and the number of students and interns

posted to the Mobile Unit in each batch. Various specialists may be sent once or twice a week or oftener, if necessary.

After visiting every home in the villages in the vicinity of the camp and after completing the functions detailed above, the Unit should move to another area for performing similar functions there. In this way such a unit can cover large areas and assume total responsibility for patient care, family care and community care in these areas which have been sadly neglected so far. It is important to note that every one of the existing 4919 Primary Health Centres is expected to cater to the needs of 100,000 to 120,000 population and the existing medical and para-medical staff in the Primary Health Centre and sub-centres are not adequate to render satisfactory service to such a large population in respect of curative and preventive medicine, public health measures and family planning programme. The successful functioning of the proposed Mobile Training-cum-Service Unit with the active participation of the villagers who can assist in various ways, will boost up the morale of the rural population who will not only clamour for more and more units but will be able to contribute liberally for their upkeep, as money is accumulating now in rural India, thanks to the green revolution. Who knows, in course of time the village folks may be able to maintain even Mobile Hospitals of the functioning in Rajasthan. This will naturally diminish the load in the city hospitals and the type increase their efficiency and let us hope that the medical students and interns trained in Mobile Units in rural areas will find it easier to work in Primary Health Centres after qualifying for their M.B., B.S. degree than the present doctors who have not had similar training.

As has been repeatedly emphasised by the Central Council of Health, it is very essential to provide the necessary incentives and basic amenities such as residential accommodation, potable water, facilities for education of children etc. for the medical, nursing and para-medical staff working in the Primary Health Centre and sub-centres. At the sixteenth meeting of the Central Council of Health held on the 4th and 5th November, 1969 in Bhopal it was resolved that special priority should be given to the implementation of the project for establishing Primary Health Centres together with the requisite number of sub-centres in about 400 blocks in remote and disadvantageous areas and also providing the necessary accommodation for the centres and residential accommodation for the staff together with the facilities like potable water supply, access road and transport. If this recommendation is implemented, Mobile Training-cum-Service Units can also cover these areas and render useful service to this hitherto totally neglected population living in remote and difficult areas.

No doubt, some of the proposals we have made here have already been made by Bhore and Mudalliar Committees and some individuals, but, unfortunately, for one reason or another, they have not been implemented satisfactorily, so that the medical students and interns have not been inculcated in the principles and practice of Comprehensive Community Medicine to the detriment of 80 per cent of our population who live in rural areas. We have reiterated some of the old proposals and added a few of our own at the present juncture when there is country-wide talk of socialism and the urgent necessity of alleviating human suffering in a large section of our population which has been hitherto neglected. Perhaps the greatest merit in the proposal for starting Mobile Training-cum-Service Unit is that like equally of mercy it blesses the students and interns who will get the necessary training in Comprehensive Community Medicine with a rural bias and the large rural population who will benefit from the humanitarian service rendered by them under the supervision of their teachers. There are 9000 to 10,000 final year M.B., B.S. students and 5000 to 6000 interns available every year for such service. Here is a challenge not only for them but also for all the teachers in the 95 medical colleges and the four postgraduate institutes and all the medical and para-medical personnel serving in the medical public health and family planning departments in the Central and State Governments, voluntary agencies and also private medical practitioners, who can all join together in this noble and laudable task, let us not forget that this combined effort will give a great push not only to all our National Health Programmes such as the Malaria and Smallpox Eradication Programmes but also to our National Family Planning Programme which is a crash programme. Lastly, but it is certainly not the least in importance, our medical students and interns, if they

are properly guided by their teachers, will have job satisfaction and a sense of fulfillment, apart from developing team spirit and discipline which will forestall student unrest in medical colleges at any rate.

ANNEXURE—II

RECOMMENDATIONS OF THE MEDICAL EDUCATION COMMITTEE AS MODIFIED OR ENLARGED BY THE MEDICAL EDUCATION CONFERENCE AND ENDORSED BY THE EXECUTIVE COMMITTEE OF THE CENTRAL COUNCIL OF HEALTH AND ACCEPTED BY THE GOVERNMENT OF INDIA.

1. *Licentiate Course*

(i) There is no need to reintroduce the diploma or Licentiate Course. The Government of India is however, of the view that the effect of this recommendation should be watched closely and the situation should be reviewed after a few years.

(ii) To make good the requirements of doctors the number of Medical Colleges and admissions in existing Medical Colleges should be increased as far as resources permit.

(iii) Training facilities for under-graduate medical education should be increased by utilising district, private, voluntary and co-operative hospitals where adequate facilities for clinical training exist and which fulfil the requirements of inspecting agencies.

2. *Entrance Requirements*

(iv) The period of study for the qualifying examination should be two years after the Matriculation/Higher Secondary Examination.

(v) The Pre-Medical Course should comprise of studies in Physics, Chemistry, Biology Basic Mathematics in relation to Physics and an introduction to the study of Statistics, Social Sciences and Languages.

(vi) The qualifying examination for entry into medical colleges should, as far as possible, be common and uniform at the State level.

3. *Method of Selection*

(vii) For the purpose of admission to medical colleges, reliance should be placed on the performance of the candidates at the qualifying examination and no separate entrance examination is necessary except for Institutions of an all-India character.

The difficulties, if any, arising from material disparities in the standards of marking at the qualifying examination should be made by measures like appointment of examiners largely from outside the concerned university and by taking into account, besides marks obtained in the qualifying examination for admission to the M.B., B.S. Course, marks obtained by the candidate in the Higher Secondary or similar other equivalent examination.

4. *Domicile Restrictions*

(viii) 5% of seats in medical colleges should be reserved on reciprocal basis for candidates from other States.

5. *Capitation Fee*

(ix) Criterion for admission to private medical colleges should also be merit and charging of capitation fee by these colleges should be discouraged. The Government of India, in consultation with the concerned State Governments will examine the economics of the proposition of take-over of these institutions by the State or Central Government or of providing financial support to them for covering the gap created by the loss of capitation fees.

6. *Scheduled Castes/Tribes*

(x) Reservation of seats in medical colleges for students of Scheduled Caste/Scheduled Tribes and concession for them in the criterion of marks for admission should continue.

7. *Reservation of Seats*

(xi) 5% of seats in medical colleges should be reserved in favour of candidates who undertake to serve in rural areas.

8. Medium of Instruction

(xii) The medium of instruction in medical colleges should, for the present, continue to be English.

9. M.B., B.S. Course including Internship

(xiii) The total duration of the M.B., B.S. course should be 4½ years followed by compulsory internship for one year. Of this, 18 months should be devoted to instruction in Pre-clinical subjects and 36 months to Para-clinical and clinical subjects.

Out of one year of internship, six months should be spent in rural areas under supervisors. Such posting should be at selected rural Primary Health Centres having adequate staff and equipment.

10. Preventive and Social Medicine

(xiv) Teaching of Preventive and Social Medicine should form an integral part of medical studies for the MBBS course and marks obtained in this discipline should be ranked along with those obtained in other disciplines for the award of the MBBS degree. Teachers of Preventive and Social Medicine should have clinical experiences.

Teaching of health promotion should be included in the course.

11. General Practitioners

(xv) General practitioners of standing and experience should be actively associated with the education and training of undergraduates to make them familiar with the problems of health in families and the community.

12. Seminars etc.

(xvi) Didactic teaching in medical colleges should be reduced and Seminars, Group discussions and Clinico-Pathological conferences should be organised.

13. Curriculum

(xvii) The curriculum suggested in the report of the Medical Education Committee (Annexure I) should serve as guidelines for the Universities and Faculties concerned.

14. Undergraduates and Medical Research

(xviii) Undergraduate medical students should be initiated into elementary medical research during the duration of the course. They may be encouraged to participate in research through special incentives like award of stipends.

15. Examinations

(xix) Examinations should be of the semester type having multiple-choice questions.

(xx) 25% of the total marks allocated for the university examination should be earmarked for internal assessment.

16. Internal Assessment

(xxi) The entire faculty should be involved in internal assessment.

17. The Basic Doctor

(xxii) Medical teaching and training should be so oriented as to produce a basic doctor who is conversant with the basic health problems of rural and urban communities and who is able to play an effective role in preventive and curative health services.

18. Basic Doctors Vis-a-Vis Specialists

(xxiii) A balance should be struck between the production of basic doctors and specialists within the limitation of financial and other resources available for medical education and health care in the country.

19. Refresher Course

(xxiv) Provision should be made for refresher course for basic doctors.

20. Doctor for Rural Areas

(xxv) Emoluments, incentives and facilities should be so provided as to tilt the overall balance of advantage in favour of doctors who have to their credit adequate service in rural areas. For this, provision of living and working accommodation with adequate facilities for drinking water, sanitary latrines should be made for doctors at rural centres. All-weather approach roads should be built for providing accessibility to Primary Health Centres and Sub-centres. Vehicles should be supplied to Primary Health Centres.

Minimum service in rural areas should be prescribed for crossing the deficiency bar or before granting promotions.

Special medical allowance should be given for service in difficult rural areas. Opportunities for refresher courses, post-graduate education and visits to institutions for advanced training in India and abroad should be made available for doctors serving or having adequate background of service in rural areas. Doctors serving in rural areas should be enabled to have the benefit of professional contacts with specialists by arranging visits of the latter to rural health centres.

21. Mobile Training cum-Service Hospitals

(xxvi) This scheme as described in the paper on "NEED-BASED UNDERGRADUATE MEDICAL EDUCATION" (Appendix I) is strongly recommended for adoption by, to begin with, selected medical colleges.

22. Location of Pre-medical Course

(xxvii) The Pre-medical course should be conducted ordinarily in science colleges affiliated to different universities.